

Town of Needham, MA
Stormwater Management Program (SWMP):
Volume 2
NPDES Phase II Small MS4 General Permit
September 2019

**ILLICIT DISCHARGE DETECTION &
ELIMINATION (IDDE) PLAN**



315 Norwood Park South
2nd Floor
Norwood, Massachusetts 02062
781.255.1982
www.BETA-Inc.com

Stormwater Management Program (SWMP): Volume 2

Town of Needham, MA

NPDES Phase II Small MS4 General Permit

ILLICIT DISCHARGE DETECTION & ELIMINATION (IDDE) PLAN

Prepared by: BETA GROUP, INC.

Prepared for: Town of Needham

September 2019

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1.0 INTRODUCTION

Needham's IDDE efforts date back to the 1996 Memorandum of Understanding (MOU) between MA DEP/EPA and the Town. The MOU and immediate efforts focused on removal of illicit discharges from areas tributary to the Charles River. In 1999, Needham conducted Town wide inspection and sampling of all its outfalls. The investigation included all discharges at headwalls and pipe ends with the exception of the State drainage system. 295 outfalls were investigated and sixteen (16) were found to have dry weather flow. Out of the sixteen (16) outfalls sampled, eight (8) were determined to have elevated levels of fecal coliform bacteria. The Town conducted a follow up investigation of the eight (8) outfalls and located and eliminated the illicit discharges. Confirmatory sampling was conducted on 2006 verifying that illicit discharges had been eliminated as was reported in the NPDES Annual Report.

Since then, Needham has been actively looking for illicit connections when conducting their annual drain infrastructure cleaning program, and since 1996, Town employees have inspected all new sewer connection installations to assure that illicit connections are not created.







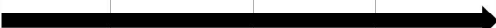
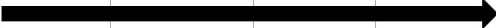


This Illicit Discharge Detection and Elimination (IDDE) Plan has been developed by the Town of Needham (the Town) to address the IDDE program requirements of the United States Environmental Protection Agency's (USEPA's) 2016 National Pollution Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in Massachusetts, hereinafter referred to as the Permit. The Permit requires a Stormwater Management Program (SWMP), which is comprised of four volumes. This IDDE Plan is Volume 2 of 4.

- SWMP Volume 1: Stormwater Management Program
- **SWMP Volume 2: Illicit Discharge Detection and Elimination (IDDE) Plan**
- SWMP Volume 3: Good Housekeeping and Pollution Prevention
- SWMP Volume 4: Annual Reports

2.0 OBJECTIVE

Needham has developed this illicit discharge detection and elimination (IDDE) program to systematically find and eliminate potential sources of non-stormwater discharges to its municipal separate storm sewer system and implement procedures to prevent future discharges. The required timeline for implementing the IDDE program is shown in **Table 2.1**.

Table 2-1 IDDE Program Implementation Timeline

IDDE Program Requirements	Completion Date from Effective Date of MS4 permit					
	1 Year	1.5 Years	2 Years	3 Years	7 Years	10 Years
Written IDDE Program Plan						
SSO Inventory						
Written Catchment Investigation Procedure						
Phase I Mapping						
Phase II Mapping (swales & updates)						
IDDE Regulatory Mechanism or By-law (if not already in place)						
Dry Weather Outfall Screening						
Follow-up Ranking of Outfalls and Interconnections						
Catchment Investigations – Problem Outfalls						
Catchment Investigations – as needed based on screening and sampling results						
On-going Screening and Composite Sampling	Annually					
Training	Annually					

3.0 WORK COMPLETED TO DATE

The 2003 MS4 Permit required each MS4 community to develop a plan to detect illicit discharges using a combination of storm system mapping, adopting a regulatory mechanism to prohibit illicit discharges and enforce this prohibition, and identifying tools and methods to investigate suspected illicit discharges. Each MS4 community was also required to define how confirmed discharges would be eliminated and how the removal would be documented.

The Town has completed the following IDDE program activities consistent with the 2003 MS4 Permit requirements:

- Developed a map of outfalls and receiving waters
- Developed and Adopted a Stormwater Bylaw
- Developed procedures for locating illicit discharges (i.e., visual screening of outfalls for dry weather discharges, dye or smoke testing)
- Developed procedures for locating the source of the discharge
- Developed procedures for removal of the source of an illicit discharge
- Developed procedures for documenting actions and evaluating impacts on the storm sewer system subsequent to removal
- Removed 9 illicit connection identified since the 1999 investigation.

In addition to the 2003 MS4 Permit requirements, other IDDE-related activities that have been completed include:

- SSO inventory
- Outfall sampling
- Additional storm system mapping, including the locations of catch basins, manholes and pipe connectivity
- Catchment Delineations
- System updates
- Map of BMP's

4.0 LEGAL AUTHORITY AND STATEMENT OF IDDE RESPONSIBILITIES

The Needham Stormwater Bylaw provides legal authority to: Prohibit illicit discharges; investigate suspected illicit discharges; eliminate illicit discharges, including discharges from properties not owned by or controlled by the MS4 that discharge into the MS4 system; and implement appropriate enforcement procedures and actions.

The stormwater bylaw was approved at the Fall 2018 Town meeting.

The Department of Public Works (DPW) is the lead municipal department responsible for implementing the IDDE program pursuant to the provisions of the Stormwater Bylaw.

5.0 DEFINITIONS

The following definitions are provided for terms used in this IDDE Plan.

A **catchment** is the area that drains to an individual outfall or interconnection.

A **sanitary sewer overflow (SSO)** is a discharge of untreated sanitary wastewater from a municipal sanitary sewer.

An **illicit discharge** is any discharge to a municipal separate storm sewer that is not composed entirely of stormwater, except discharges pursuant to a NPDES permit (other than the NPDES permit for discharges from the municipal separate storm sewer) and discharges resulting from firefighting activities.

An **interconnection** means the point (excluding sheet flow over impervious surfaces) where the permittee's MS4 discharges to another MS4 or other storm sewer system, through which the discharge is conveyed to waters of the United States or to another storm sewer system and eventually to a water of the United States.

Junction Manhole is a manhole or structure with two or more inlets accepting flow from two or more drainage alignments. For the purposes of this report, manholes with inlets solely from individual catch basins are not considered junction manholes.

Key junction is a manhole or structure that can represent one or more junction manholes without compromising adequate implementation of the IDDE program. Adequate implementation of the IDDE program would not be compromised if the exclusion of a particular junction manhole as a key junction manhole would not affect the ability to determine possible presence of an upstream illicit discharge.

The **MATRIX** is the Outfall/Interconnection Data and Priority Ranking table

MS4 is a municipal separate storm sewer system

The **MS4 Permit** is the United States Environmental Protection Agency's (USEPA's) 2016 National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems (MS4) in Massachusetts

An **outfall** means a point source as defined by 40 CFR § 122.2 as the point where the municipal separate storm sewer discharges to waters of the United States. An outfall does not include open conveyances connecting two municipal separate storm sewers or pipes, tunnels or other conveyances that connect segments of the same stream or other waters of the United States and that are used to convey waters of the United States. (40 CFR § 122.26(b)(9)).

6.0 PROHIBITIONS AND REQUIRED ACTIONS

Illicit discharges and sanitary sewer overflows (SSOs) to its MS4 are prohibited.

Upon detection of an illicit discharge or SSO, the Town will commence action to locate, identify and eliminate the illicit discharge as expeditiously as possible. Upon identification of the illicit source the Town will notify all responsible parties for any such discharge and require immediate cessation of improper disposal practices in accordance with its legal authorities. Where elimination of an illicit discharge within 60 days of its identification as an illicit discharge is not possible, the Town will establish an expeditious schedule for its elimination and report the dates of identification and schedules for removal in Needham's annual reports. The Town will diligently pursue elimination of all illicit discharges, and in the interim, the town will take all reasonable and prudent measures to minimize the discharge of pollutants to and from its MS4.

7.0 NON-STORMWATER DISCHARGES

The following categories of non-stormwater discharges are allowed under MS4 Permit unless the Town, EPA, or the MassDEP identifies any category or individual discharge of non-stormwater discharge listed below as a significant contributor of pollutants to the MS4, then that category or individual discharge is not allowed, but rather to be deemed an “illicit discharge” and is to be treated as part of the Illicit Discharge Detection and Elimination (IDDE) Program.

- Water line flushing
- Landscape irrigation
- Diverted stream flows
- Rising ground water
- Uncontaminated ground water infiltration (as defined at 40 CFR § 35.2005(20))
- Discharge from potable water sources
- Air conditioning condensation
- Lawn watering
- Flows from wetland resources areas
- Discharges of flow from firefighting activities
- Discharges necessary to protect health, safety, welfare or the environment

Discharges or flows from firefighting activities are allowed under the MS4 Permit and need only be addressed where they are identified as significant sources of pollutants to waters of the United States.

8.0 SANITARY SEWER OVERFLOWS

Needham has identified all known locations where SSOs have discharged to the MS4 within the previous five (5) years. This includes SSOs resulting, during dry or wet weather, from inadequate conveyance capacities, or where interconnectivity of the storm and sanitary sewer infrastructure that allows for communication of flow between the systems. The inventory of all identified SSOs includes the following information, if available:

- Location (approximate street crossing/address and receiving water, if any);
- A statement of whether the discharge entered a surface water directly or entered the MS4;
- Date(s) and time(s) of each known SSO occurrence (i.e., beginning and end of any known discharge);
- Estimated volume(s) of the occurrence;
- Description of the occurrence indicating known or suspected cause(s);
- Mitigation and corrective measures completed with dates implemented; and
- Mitigation and corrective measures planned with implementation schedules.

The Town maintains the inventory as a part of the SWMP and updates the inventory annually, including the information noted above.

In accordance with Paragraph B.12 of Appendix B of the MS4 Permit, upon becoming aware of an SSO to the MS4, the Town will provide oral notice to EPA within 24 hours. Additionally, the Town of Needham will provide written notice to EPA and MassDEP within five (5) days of becoming aware of the SSO occurrence and will include the information in the updated inventory. The notice will contain all of the information listed in part 2.3.4.4.b. Where common notification requirements for SSOs are included in multiple NPDES permits issued the Town, a single notification may be made to EPA as directed Needham's wastewater or CSO NPDES permit and constitutes compliance with this part.

The Town will include and update the SSO inventory in its annual report, including the status of mitigation and corrective measures implemented by the Town of Needham to address each SSO identified pursuant to this part.

It is understood that the period between detection and elimination of a discharge from the SSO to the MS4 is not a grace period. Discharges from an MS4 that are mixed with an SSO are not authorized by the MS4 Permit and remain unlawful until eliminated.

9.0 SYSTEM MAPPING

The Town developed a storm sewer system map in 1999. The map was updated to meet the requirements of the 2003 MS4 Permit and includes most of the 2016 MS4 permit requirements of Phase I and Phase II. Needham's overall stormwater collection system is composed of the piping network (manholes, catchbasins and outfalls), culverts, swales, detention basins, wetlands, streams, lakes, ponds and rivers.

The map was updated in 2017, and will be updated periodically as new information becomes available. The mapping includes a depiction of the Town's separate storm sewer system in the MS4 permit area and is intended to facilitate the identification of key infrastructure and factors influencing proper system operation, and the potential for illicit sanitary sewer discharges. The Town also developed a sewer system map during an infiltration inflow investigation conducted in 2016. **Appendix A** provides 8.5x11 copies of the storm sewer system map and sanitary sewer system map, for full size maps see Appendix C in the Stormwater Management Plan (SWMP).

The Town will update the mapping as necessary to reflect newly discovered information and required corrections or modifications and will report on the progress towards the completion of the system map in each annual report.

10.0 OUTFALL AND INTERCONNECTION INVENTORY

The MS4 Permit requires an assessment and priority ranking of outfalls in terms of their potential to have illicit discharges and SSOs and the related public health significance. The ranking helps determine the priority order for performing IDDE investigations. The priority is to be updated annually to reflect data collected in connection with dry weather screening and other relevant inspections conducted by the Town as part of the IDDE program.

11.0 INITIAL RANKING OF OUTFALLS AND INTERCONNECTIONS

Initial outfall and interconnection inventory and priority ranking were based on characteristics of their catchment areas as described in part 2.3.4.7(a) of the MS4 Permit. **Appendix B** provides the outfall inventory and priority ranking matrix. The inventory will be updated annually to include data collected during dry weather screening and other relevant inspections and provided in each annual report.

The MATRIX classifies each of the Town's outfalls and interconnections into one of the following categories:

Problem Outfalls: Outfalls/interconnections with known or suspected contributions of illicit discharges based on existing information will be designated as Problem Outfalls. This will include any outfalls/interconnections where previous screening indicates likely sewer input. Problem Outfalls need not be screened pursuant to part 2.3.4.7.b. of the MS4 permit.

High Priority Outfalls: Outfalls/interconnections that have not been classified as Problem Outfalls and that are:

- discharging to an area of concern to public health due to proximity of public beaches, recreational areas, drinking water supplies or shellfish beds;
- determined by the permittee as high priority based on the characteristics listed above or other available information;

Low Priority Outfalls: Outfalls/interconnections determined by the permittee as low priority based on the characteristics listed below or other available information.

Excluded outfalls: Outfalls/interconnections that have no potential for illicit discharges. This category is limited to roadway drainage in undeveloped areas with no dwellings and no sanitary sewers; drainage for athletic fields, parks or undeveloped green space and associated parking without services; cross-country drainage alignments (that neither cross nor are in proximity to sanitary sewer alignments) through undeveloped land.

12.0 DRY WEATHER OUTFALL AND INTERCONNECTION SCREENING AND SAMPLING

The Town will conduct screening of all outfalls/interconnections (excluding Problem and excluded Outfalls) in accordance with their initial ranking. The Town-owned MS4 infrastructure areas have been subdivided into sixteen (16) sub-watersheds. Within these sub-watersheds one or two locations have been determined as the most downstream point(s) for sampling of dry and wet weather flows. These locations, 19 total, will be used for ongoing annual dry weather screening and sampling, consistent with the procedures below, to provide a composite sampling result for each sub watershed. **Appendix C** provides a 8.5 x11 copy of the IDDE Composite Ranking Map, for full size map see Appendix C in the Stormwater Management Plan (SWMP). Further screening and sampling and catchment investigations will be conducted with the procedures described in Sections 12 & 14 based on the composite sampling results if there is evidence of illicit connections.

12.1 General Procedure for Outfall Screening

Dry weather screening will proceed only when no more than 0.1 inches of rainfall has occurred in the previous 24-hour period and no significant snow melt is occurring.

The Town will record all of the following information and will include it in the summary report:

- Unique identifier,
- Receiving water,
- Date of most recent inspection,
- Dimensions,
- Shape,
- Material (concrete, PVC),
- Spatial location (latitude and longitude with a minimum accuracy of +/-30 feet,
- Physical condition,
- Indicators of potential non-stormwater discharges (including presence or evidence of suspect flow and sensory observations such as odor, color, turbidity, floatables, or oil sheen).

If an outfall/interconnection is inaccessible or submerged, the Town will proceed to the first accessible upstream manhole or structure for the observation and report the location with the screening results.

12.2 General Procedure for Outfall Sampling

At the 19 composite sampling locations, screening will be completed as described above. Sampling will be completed as follows:

If no flow is observed, but evidence of illicit flow exists, the Town will revisit the outfall during dry weather within one week of the initial observation, if practicable, to perform a second dry weather screening and sample any observed flow (proceed as in iv. below).

Where dry weather flow is found at an outfall/interconnection, at least one (1) sample will be collected and analyzed at a minimum for:

- Ammonia,
- Chlorine,
- Conductivity,
- Salinity,
- E. coli (freshwater receiving water) or enterococcus (saline or brackish receiving water),
- Surfactants (such as MBAS),
- Temperature, and
- Pollutants of concern; where the discharge is directly into a water quality limited water or a water subject to an approved TMDL the sample will be analyzed for the pollutant(s) identified as the cause of the impairment. The receiving waters and pollutants of concern for sampling are identified in **Table 12-1** and correspond to map figures in **Appendix C**.

All analyses with the exception of indicator bacteria and pollutants of concern can be performed with field test kits or field instrumentation. Detailed Dry weather screening and sampling procedures, methods and forms can be found in **Appendix D**. The Town will submit all screening and sampling data collected in compliance with the permit in its Annual Report.

12.2 Interpreting Results

Outfalls/interconnections where sampling results indicate sewer input based on the following criteria of the MS4 permit will be considered highly likely to contain an illicit discharge:

- Olfactory or visual evidence of sewage,
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and bacteria levels greater than the water quality criteria applicable to the receiving water, or
- Ammonia ≥ 0.5 mg/L, surfactants ≥ 0.25 mg/L, and detectable levels of chlorine.

13.0 FOLLOW-UP RANKING OF OUTFALLS AND INTERCONNECTIONS

Needham will update and re-prioritize the initial outfall and interconnection rankings based on information gathered during dry weather screening. Rankings will be updated periodically as dry weather screening information becomes available, but will be completed within three (3) years of the effective date of the MS4 permit (July 1, 2021).

The MATRIX will be updated annually, if necessary, to reprioritize outfalls and interconnections based on information gathered during dry weather screening. Outfalls/interconnections where relevant information was found indicating sewer input to the MS4 or sampling results indicating sewer input will be considered highly likely to contain illicit discharges from sanitary sources, and such outfalls/interconnections will be ranked at the top of the High Priority Outfalls category for investigation. Other outfalls and interconnections may be re-ranked based on any new information from the dry weather screening.

14.0 CATCHMENT INVESTIGATIONS

Once stormwater outfalls with evidence of illicit discharges have been identified, various methods can be used to trace the source of the potential discharge within the outfall catchment area. Catchment investigation techniques include but are not limited to review of maps, historic plans, and records; manhole observation; dry and wet weather sampling; video inspection; smoke testing; and dye testing. This section outlines a systematic procedure to investigate outfall catchments to trace the source of potential illicit discharges. All data collected as part of the catchment investigations will be recorded and reported in each annual report along with an inventory of catchment investigations completed.

14.1 System Vulnerability Identification

Begin by reviewing relevant mapping and system vulnerability factors previously identified for the catchment. Look for any new information that may be available including Board of Health records on septic systems, plans related to recent construction of storm and sanitary sewer infrastructure, and complaint records related to SSOs. Use this information to identify areas within the catchment with higher potential for illicit connections.

14.2 Dry Weather Key Junction Manhole Inspections

Field crews are to systematically inspect key junction manholes and gather catchment information of the location of MS4 pipes, manholes and the extent of the contributing catchment. Begin at the first key junction upgradient of the outlet/interconnection or previously investigated key junction and work progressively upstream inspecting and sampling at manholes in the storm drain network to isolate the illicit discharge source as follows:

During dry weather, key junction manholes will be opened and inspected systematically for visual and olfactory evidence of illicit connections (e.g., excrement, toilet paper, gray filamentous bacterial growth, or sanitary products present).

If flow is observed, the Town will sample the flow at a minimum for ammonia, chlorine and surfactants using field kits for these analyses.

Where sampling results or visual or olfactory evidence indicate potential illicit discharges or SSOs, the area draining to the junction manhole will be flagged for further upstream investigation.

Key junction and subsequent manhole investigations will proceed, repeating the inspection and sampling of upstream key junction manholes until the location of suspected illicit discharges or SSOs can be isolated to a pipe segment between two manholes. Source isolation and confirmation procedures will then be followed as described in **Section 15**. If no evidence of an illicit discharge is found, catchment investigations will be considered complete upon completion of key junction manhole sampling.

Where catchments do not contain junction manholes, the dry weather screening and sampling will be considered as meeting the manhole inspection requirement and source isolation and confirmation procedures will be followed as described in **Section 15**.

For most catchments, manhole inspections will proceed from the outfall moving up into the system as described. However, depending on the nature of the drainage system and availability it may be more efficient to move from upstream down, particularly if the sources of illicit discharges are believed to be located in the upstream portions of the catchment area. In either case, once a manhole inspection methodology has been selected, investigations will continue systematically through the catchment.

14.3 Wet Weather Investigation

At least one wet weather screening and sampling will be conducted at the 19 composite sampling outfall locations with the same parameters required during dry weather screening. Wet weather condition sampling will be completed to the extent necessary to determine whether wet-weather induced high flows in the sanitary sewers or high groundwater in areas of septic systems result in discharge of sanitary flow to the MS4. Wet weather outfall sampling will be conducted as follows:

Wet weather sampling and screening will proceed during or after a storm event of sufficient depth or intensity to produce a stormwater discharge at the outfall. Every effort should be made to sample during the spring (March through June) when groundwater levels are relatively high.

The MS4 permit does not require a minimum rainfall event prior to wet weather screening however, it must be an event with enough depth or intensity to produce a stormwater discharge at the outfall. Sampling should be avoided during the initial period of discharge (“first flush”).

If wet weather outfall sampling indicates a potential illicit discharge, then additional wet weather source sampling will be performed, as warranted, or source isolation and confirmation procedures will be followed as described in **Section 15**. If wet weather outfall sampling does not identify evidence of illicit discharges then the wet weather investigation is complete.

15.0 IDENTIFICATION/CONFIRMATION OF ILLICIT SOURCE

Where the source of an illicit discharge has been reported and/or delimited between two manholes, more detailed investigation techniques will be used to isolate and confirm the source. Based on the site conditions, one or more of the following techniques may be used:

Sandbagging

Sandbagging is a technique that can be particularly useful when attempting to isolate intermittent illicit discharges or those with very little perceptible flow. The technique involves placing sandbags or similar barriers (e.g., caulking, weirs/plates, or other temporary barriers) within outlets to manholes to form a temporary dam that collects any intermittent flows that may occur. Sandbags are typically left in place for 48 hours, and **should only be installed when dry weather is forecast**. If flow has collected behind the sandbags/barriers after 48 hours it can be assessed using visual observations or by sampling. If no flow collects behind the sandbag, the upstream pipe network can be ruled out as a source of the intermittent discharge. Finding appropriate durations of dry weather and the need for multiple trips to each manhole makes this method both time-consuming and somewhat limiting.

Dye Testing

Dye testing is used to confirm a suspected illicit connection to a storm drain system. Prior to testing, permission to access the site should be obtained. Dye is discharged into the suspected fixture, and nearby storm drain structures and sanitary sewer manholes observed for presence of the dye. Each fixture, such as sinks, toilets, and sump pumps, should be tested separately. A third-party contractor may be required to perform this testing activity.

Smoke Testing

Smoke testing can be used to locate the source of illicit discharges when there is no obvious potential source. Smoke testing is an appropriate tracing technique for short sections of pipe and for pipes with small diameters. Smoke added to the storm drain system will emerge in connected locations. A third-party contractor may be required to perform this testing activity.

Closed Circuit Television Inspection (CCTV)

CCTV can be used to locate illicit connections and infiltration from sanitary sewers. In CCTV, cameras are used to record the interior of the storm drain pipes. They can be manually pushed with a stiff cable or guided remotely on treads or wheels. A third-party contractor may be required to perform this testing activity.

16.0 ILLICIT DISCHARGE REMOVAL

When the specific source of an illicit discharge is identified, the Town will exercise its authority as necessary to require its removal pursuant to part 2.3.4.2 or 2.3.4.3 of the MS4 permit and in accordance with the Town By-law.

For each confirmed source the Town will include in the annual report the following information:

- The location of the discharge and its source(s);
- A description of the discharge;
- The method of discovery;
- Date of discovery;
- Date of elimination, mitigation or enforcement action OR planned corrective measures and a schedule for completing the illicit discharge removal; and
- Estimate of the volume of flow removed.

Within one (1) year of removal of all identified illicit discharges within a catchment area, confirmatory outfall or interconnection screening will be conducted. The confirmatory screening will be conducted in dry weather unless System Vulnerability Factors have been identified, in which case both dry weather and wet weather confirmatory screening will be conducted. If confirmatory screening indicates evidence of additional illicit discharges, the catchment will be scheduled for additional investigation.

17.0 ONGOING SCREENING

The Town-owned MS4 infrastructure areas have been subdivided into sixteen (16) sub-watersheds with 19 composite sampling locations that will be used for ongoing annual dry and wet weather screening and sampling. Ongoing screening and sampling will be in accordance with procedures described in Section 12 of this plan. Appendix C provides an 8.5 x11 copy of the IDDE Composite Ranking Map, for full size map see Appendix C in the Stormwater Management Plan (SWMP). Further screening and sampling and catchment investigations will be conducted with the procedures described in Sections 12 & 14 based on the composite sampling results if there is evidence of illicit connections. This ongoing screening and sampling program will run in conjunction with the current TV inspection program to identify illicit connections. The TV inspection program is an ongoing program to inspect 10% of the Town's drainage system every year. The program has proven to be successful in identifying illicit connections and in the future will use composite sampling results to inspection target efforts.

18.0 TRAINING

The Town will, at a minimum, annually provide training to the appropriate employees about the IDDE program, including how to recognize illicit discharges and SSOs. Training Records will be maintained by the DPW. The frequency and type of training will be included in the annual report.

19.0 CITIZEN CALL IN REPORTS

The Town will provide opportunity to report suspected illicit discharges through their stormwater website, email, phone and office visit. Reports by residents and other users of a water body can be effective tools in identifying the presence of illicit discharges. Many communities have set up phone hotlines for this purpose, or have provided guidance to local police departments and dispatch centers to manage data reported in this manner. Municipal employees and the general public should receive education to help identify the signs of illicit discharges and should be informed how to report such incidents.

When a call is received about a suspected illicit discharge, an IDDE Incident Tracking Sheet shall be used to document appropriate information.

Potential illicit discharges reported by citizens should be reviewed on an annual basis to locate patterns of illicit discharges, identify high-priority catchments, and evaluate the call-in inspection program.

20.0 INDICATORS OF IDDE PROGRAM PROGRESS AND REPORTING

The progress and effectiveness of the IDDE program will be evaluated and reported on in each annual report. The success of the IDDE program will be measured by the IDDE activities completed within the required MS4 permit timelines. Indicators and documentation for tracking the program success will include:

- The MATRIX, updated annually with data collected as part of catchment investigations
- All dry and wet weather screening and sampling results
- Reports on actions taken, SSOs and illicit connection identified and removed, and the estimated volume of sewage removed
- The number and percent of total Town-owned MS4 catchment areas evaluated using the IDDE program procedures
- Training records for frequency and type of employee training

Table 12-1: Needham's Waterbodies and Impairments

NAME	Category	SEGMENT ID	DESCRIPTION	SUB CATCHMENTS	IMPAIRMENT CAUSE (EPA TMDL No.)	MONITORING PARAMETERS FOR ANALYSIS
Rosemary Brook	4A	MA72-25	Headwaters, outlet Rosemary Lake, Needham to confluence with the Charles River, Wellesley	10, 11, 12, 13	Oxygen, Dissolved (40317)	Dissolved Oxygen, Temp, BOD, Total Phosphorus
					Phosphorus (Total) (40317)	Total Phosphorus
Fuller Brook	5	MA72-18	Headwater south of Route 135, Needham to confluence with Waban Brook, Wellesley	14, 15, 16	(Physical substrate habitat alterations*)	NMR
					Escherichia coli (32374)	E. coli
					Nutrient/Eutrophication Biological Indicators (40317)	Total Phosphorus
					Sedimentation/Siltation	Total Suspended Solids
Charles River	5	MA72-06	South Natick Dam, Natick to Chestnut Street, Needham/Dover	1, 2	(Eurasian Water Milfoil, Myriophyllum spicatum*)	NMR
					(Non-Native Aquatic Plants*)	NMR
					(Other flow regime alterations*)	NMR
					DDT in Fish Tissue	NMR
					Excess Algal Growth (40317)	Total Phosphorus
					Fishes Bioassessments	Contact MassDEP
					Nutrient/Eutrophication Biological Indicators (40317)	Total Phosphorus
					PCB in Fish Tissue	NMR
					Phosphorus (Total) (40317)	Total Phosphorus
Charles River	5	MA72-07	Chestnut Street, Needham to Watertown Dam, Watertown	3, 5, 8, 9	(Eurasian Water Milfoil, Myriophyllum spicatum*)	NMR
					(Fish-Passage Barrier*)	NMR
					(Non-Native Aquatic Plants*)	NMR
					(Other flow regime alterations*)	NMR
					DDT in Fish Tissue	NMR
					Escherichia coli (32370)	E. Coli
					Fishes Bioassessments	Contact MassDEP
					Harmful Algal Bloom (40317)	Total Phosphorus
					Nutrient/Eutrophication Biological Indicators (40317)	Total Phosphorus
					PCB in Fish Tissue	NMR
Alder Brook	5	MA72-22	Headwaters northwest of Route 135 and South Street intersection, Needham to the confluence with the Charles River, Needham	4, 6	Aquatic Macroinvertebrate Bioassessments	Contact MassDEP
					Nutrient/Eutrophication Biological Indicators (40317)	Total Phosphorus
Cutler Lake	5	MA72055	Needham	7	Turbidity (WQLW)	Total Suspended Solids and Turbidity

* TMDL not required (Non-pollutant)

NMR = No Monitoring Requirement

Source: Massachusetts Year 2016 Integrated List of Waters

(http://www.mass.gov/eea/docs/dep/water/resources/07v5/16ilwplst.pdf)

APPENDIX A – Storm Sewer System Map & Sewer System Map

Town of Needham, Massachusetts

Storm Sewer System Map

Map Legend

Conveyance

Pipe (Flow Direction)

Drain Outfall

(Drain Manhole

) Drain Catch Basin

Hydrography

Hydrologic Connection

Open Water

Wetland

Major Watershed Boundary

*MassDEP 2014 Integrated List of Waters

Rivers: Category 4A

Lakes, Estuaries: Category 4A

Rivers: Category 4C

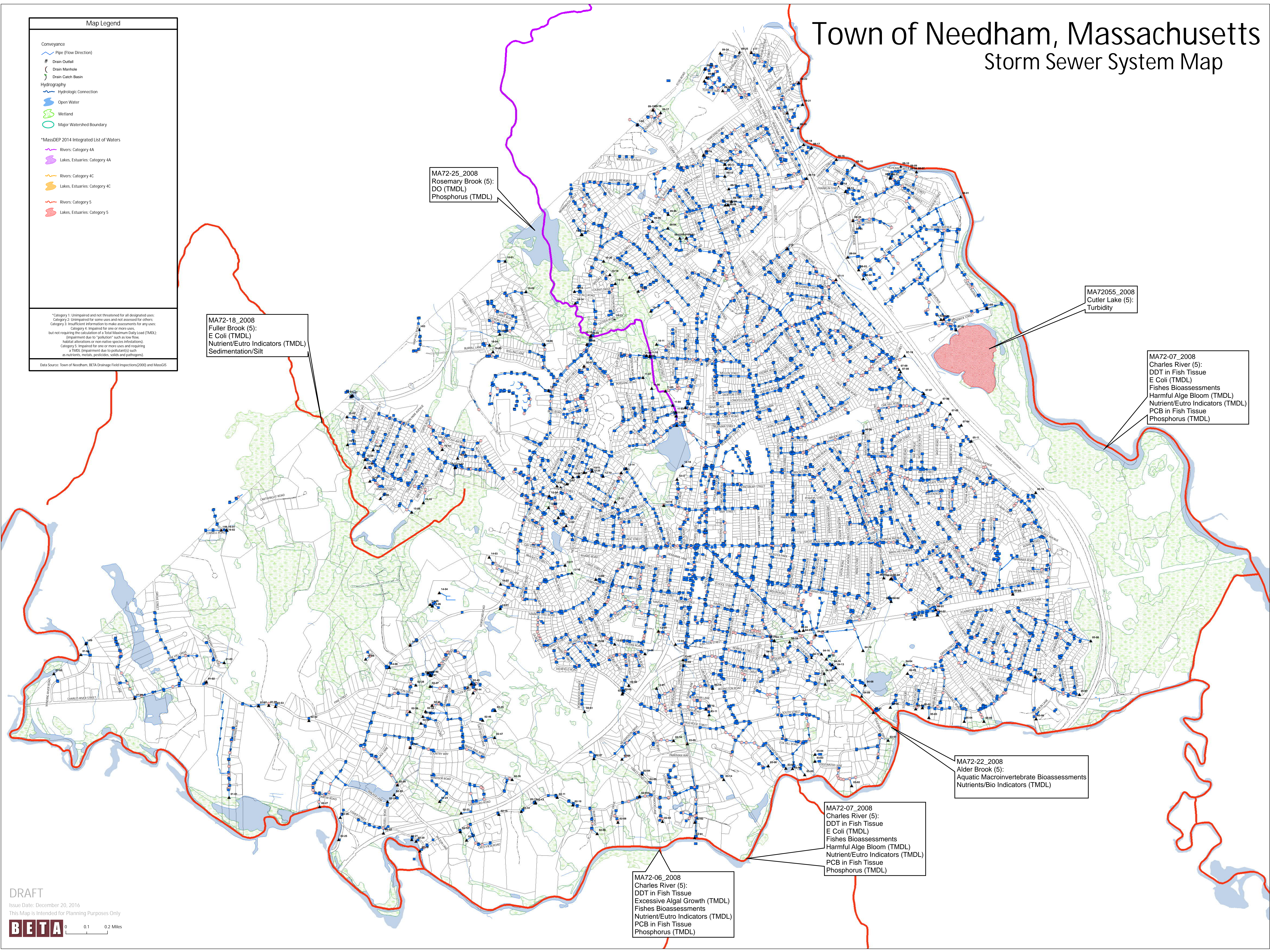
Lakes, Estuaries: Category 4C

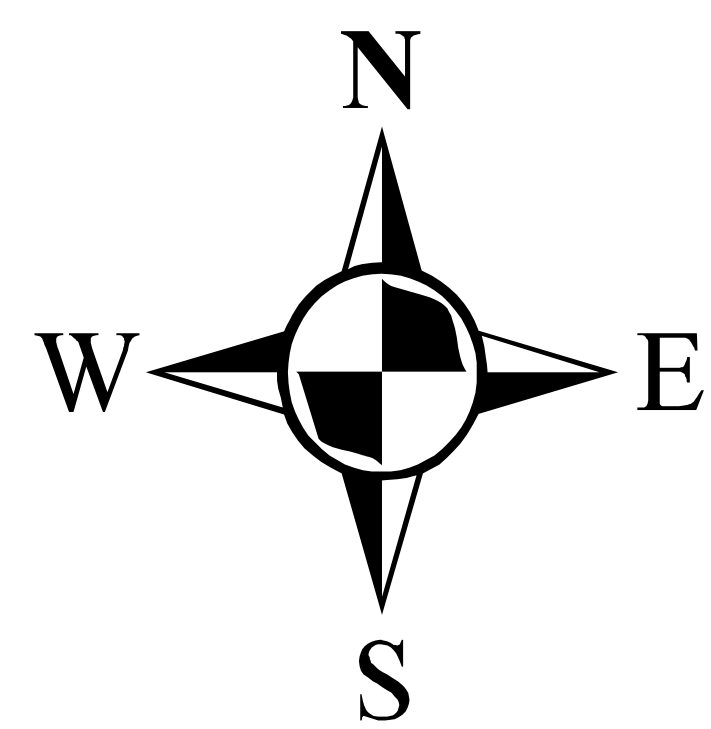
Rivers: Category 5

Lakes, Estuaries: Category 5

*Category 1: Unimpaired and not threatened for all designated uses;
Category 2: Unimpaired for some uses and not assessed for others;
Category 3: Insufficient information to make assessments for any uses;
Category 4: Impaired for one or more uses, but not requiring the calculation of a Total Maximum Daily Load (TMDL);
Impairment due to "pollution" such as low flow, habitat alterations or non-native species infestations;
Category 5: Impaired for one or more uses and requiring a TMDL (impairment due to pollutant(s) such as nutrients, metals, pesticides, solids and pathogens).

Data Source: Town of Needham, BETA Drainage Field Inspectors(2009) and MassGIS





Town of Needham, MA Sewer System Map

Legend

Sewer Manhole

Force Main

Unknown

4" - 6"

8"

10" - 12"

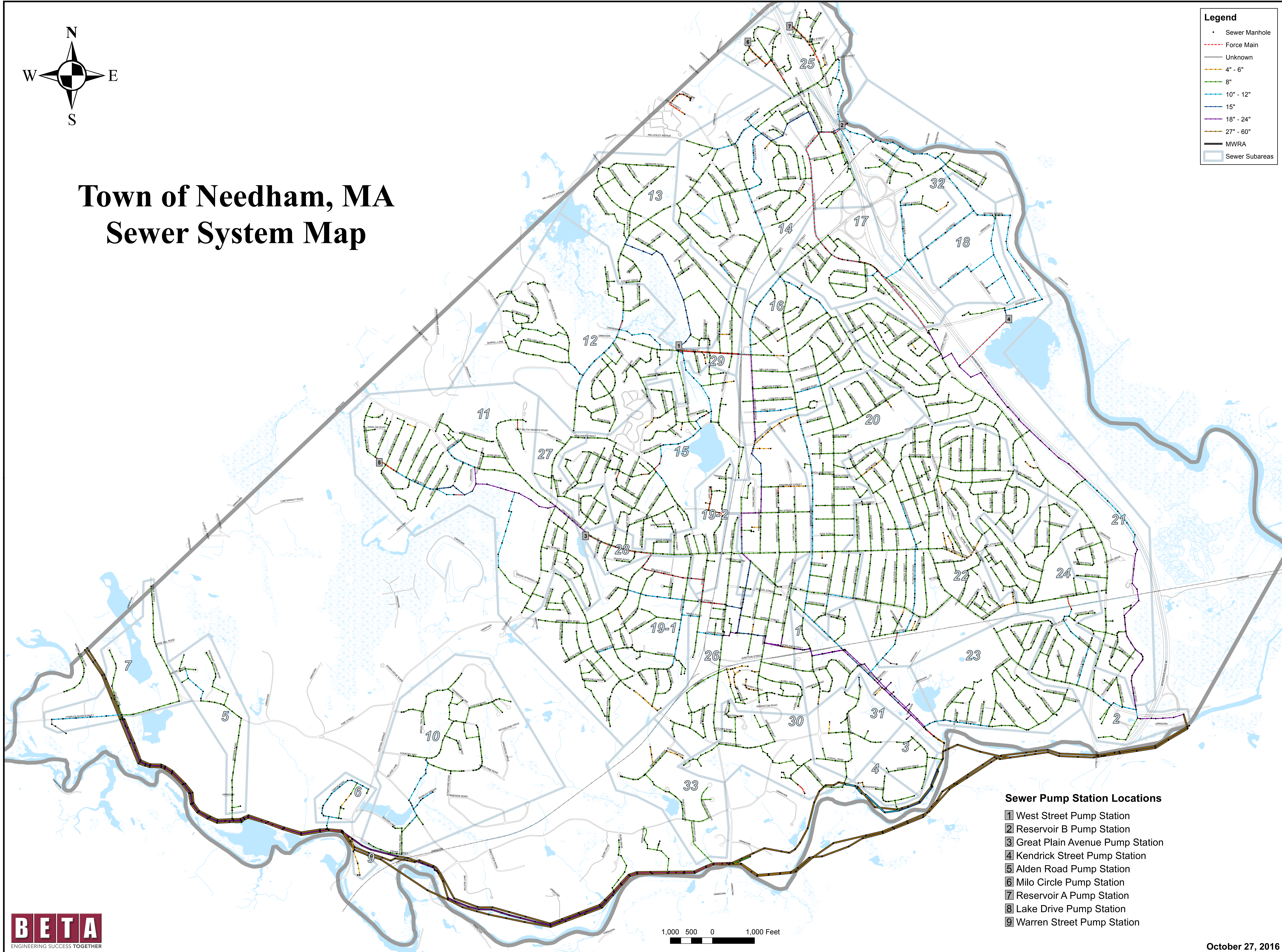
15"

18" - 24"

27" - 60"

MWRA

Sewer Subareas



Sewer Pump Station Locations

- 1 West Street Pump Station
- 2 Reservoir B Pump Station
- 3 Great Plain Avenue Pump Station
- 4 Kendrick Street Pump Station
- 5 Alden Road Pump Station
- 6 Milo Circle Pump Station
- 7 Reservoir A Pump Station
- 8 Lake Drive Pump Station
- 9 Warren Street Pump Station

APPENDIX B – Outfall & Interconnection Inventory and Priority Ranking

Town of Needham, MA

Outfalls, Interconnections Inventory and Initial Priority Ranking

Outfall/Sub basin/Interco nnection ID	Category (Problem, High, Low, Excluded)	Wet Weather Sample	Catchment Investigation Required*	System Vulnerability Factors (SVFs) (Yes=1, No=0)									
				History of SSOs?	Common storm & sanitary manholes?	Common trench construction of storm & sanitary sewers?(1)	Locations of storm drains crossing under sanitary sewer? (2)	Sanitary sewer constructed with an underdrain?(3)	Inadequate sanitary sewer LOS (regular surcharge /complaints)?	Areas formerly served by combined systems?	Sanitary sewer infrastructure defects identified through I/I investigations?(4)	Sewer Infrustr. >40 yrs old?	Widespread need for septic system upgrades?
13-09	High	Yes	Yes	1	0	0	0	0	0	0	1	1	0
01-04	High	Yes	Yes	0	0	0	0	0	0	0	0	1	0
03-06	High	Yes	Yes	0	0	0	0	0	0	0	1	1	1
03-07	High	Yes	Yes	0	0	0	0	0	0	0	1	1	1
03-09	High	Yes	No	0	0	0	0	0	0	0	1	1	1
04-19	High	Yes	Yes	1	0	0	0	0	1	0	0	1	0
05-05	High	Yes	Yes	0	0	0	0	0	0	0	0	1	0
05-06	High	Yes	No	0	0	0	0	0	0	0	0	1	0
05-09	High	Yes	Yes	0	0	0	0	0	0	0	0	1	0
07-01	High	Yes	Yes	1	0	0	0	0	0	0	1	1	0
08-01	High	Yes	Yes	0	0	0	0	0	0	0	1	1	0
08-02	High	Yes	Yes	0	0	0	0	0	0	0	1	1	0
08-03	High	Yes	No	0	0	0	0	0	0	0	1	1	0
08-04	High	Yes	No	0	0	0	0	0	0	0	1	1	0
08-05	High	Yes	No	0	0	0	0	0	0	0	1	1	0
08-06	High	Yes	No	0	0	0	0	0	0	0	1	1	0
08-09	High	Yes	Yes	0	0	0	0	0	0	0	1	1	0
08-10	High	Yes	No	0	0	0	0	0	1	0	1	1	0
08-11	High	Yes	No	0	0	0	0	0	0	0	1	1	0
08-12	High	Yes	No	0	0	0	0	0	0	0	1	1	0
08-13	High	Yes	Yes	0	0	0	0	0	0	0	1	1	0
08-15	High	Yes	Yes	0	0	0	0	0	1	0	1	1	0
08-16	High	Yes	No	0	0	0	0	0	1	0	1	1	0
08-17	High	Yes	No	0	0	0	0	0	1	0	1	1	0
08-18	High	Yes	Yes	0	0	0	0	0	1	0	1	1	0
08-20	High	Yes	No	0	0	0	0	0	1	0	0	1	0
08-21	High	Yes	No	0	0	0	0	0	1	0	0	1	0
09-02	High	Yes	Yes	0	0	0	0	0	1	0	1	1	0
09-07	High	Yes	Yes	0	0	0	0	0	0	0	1	1	0
10-11	High	Yes	No	0	0	0	0	0	0	0	0	1	0
10-12	High	Yes	No	0	0	0	0	0	0	0	0	1	0
11-05	High	Yes	Yes	0	0	0	0	0	0	0	0	1	0
11-08	High	Yes	No	0	0	0	0	0	0	0	0	1	0
11-09	High	Yes	Yes	0	0	0	0	0	1	0	0	1	0
11-11	High	Yes	Yes	0	0	0	0	0	1	0	1	1	0
12-01	High	Yes	Yes	0	0	0	0	0	0	0	1	1	0
12-02	High	Yes	Yes	0	0	0	0	0	0	0	1	1	0
12-05	High	Yes	Yes	0	0	0	0	0	0	0	1	1	0
12-16	High	Yes	Yes	0	0	0	0	0	1	0	0	1	0
12-19	High	Yes	Yes	0	0	0	0	0	1	0	1	1	0
13-04	High	Yes	Yes	0	0	0	0	0	0	0	0	1	0
I-05	High	Yes	Yes	0	0	0	0	0	0	0	1	1	0
01-05	High	Yes	No	0	0	0	0	0	0	0	0	0	1
02-19	High	Yes	No	0	0	0	0	0	0	0	0	0	1
02-25	High	Yes	No	0	0	0	0	0	0	0	0	1	0
02-26	High	Yes	No	0	0	0	0	0	0	0	0	1	1
08-07	High	Yes	No	0	0	0	0	0	0	0	1	1	0
08-08	High	No	No	0	0	0	0	0	0	0	0	0	0
08-22	High	Yes	No	0	0	0	0	0	0	0	0	1	0

Town of Needham, MA

Outfalls, Interconnections Inventory and Initial Priority Ranking

Outfall/Sub basin/Interco nnection ID	Category (Problem, High, Low, Excluded)	Wet Weather Sample	Catchment Investigation Required*	System Vulnerability Factors (SVFs) (Yes=1, No=0)									
				History of SSOs?	Common storm & sanitary manholes?	Common trench construction of storm & sanitary sewers?(1)	Locations of storm drains crossing under sanitary sewer? (2)	Sanitary sewer constructed with an underdrain?(3)	Inadequate sanitary sewer LOS (regular surcharge /complaints)?	Areas formerly served by combined systems?	Sanitary sewer infrastructure defects identified through I/I investigations?(4)	Sewer Infrustr. >40 yrs old?	Widespread need for septic system upgrades?
12-18	High	Yes	No	0	0	0	0	0	0	0	0	1	0
01-06	High	Yes	No	0	0	0	0	0	0	0	0	1	0
02-01	High	No	Yes	0	0	0	0	0	0	0	0	0	0
02-20	High	Yes	No	0	0	0	0	0	0	0	0	0	1
02-21	High	Yes	No	0	0	0	0	0	0	0	0	0	1
02-27	High	Yes	Yes	0	0	0	0	0	0	0	1	1	0
02-03	Low	Yes	Yes	0	0	0	0	0	0	0	0	0	1
02-04A	Low	Yes	Yes	0	0	0	0	0	0	0	0	0	1
02-22	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
03-01	Low	Yes	Yes	0	0	0	0	0	0	0	1	1	0
03-02	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
03-03	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
03-04	Low	Yes	No	0	0	0	0	0	0	0	0	0	1
03-05	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
03-08	Low	Yes	Yes	0	0	0	0	0	0	0	1	1	0
03-11/12	Low	Yes	Yes	0	0	0	0	0	0	0	1	1	0
03-13	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
04-01	Low	Yes	Yes	0	0	0	0	0	0	0	1	1	0
04-04	Low	Yes	Yes	0	0	0	0	0	0	0	0	1	0
04-07	Low	Yes	No	0	0	0	0	0	1	0	0	1	0
04-08	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
04-16	Low	Yes	Yes	0	0	0	0	0	0	0	1	1	0
05-01	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
05-02	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
05-03	Low	Yes	Yes	0	0	0	0	0	0	0	0	1	0
05-04	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
05-07	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
05-08	Low	Yes	Yes	0	0	0	0	0	0	0	1	1	0
05-10	Low	Yes	Yes	0	0	0	0	0	0	0	1	1	0
05-11	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
06-01/02	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
06-06	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
08-14	Low	No	No	0	0	0	0	0	0	0	0	0	0
08-19	Low	Yes	No	0	0	0	0	0	0	0	1	0	0
08-23	Low	Yes	Yes	0	0	0	0	0	0	0	0	1	0
09-03	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
09-04	Low	Yes	Yes	0	0	0	0	0	0	0	1	1	0
09-05	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
09-08	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
09-09	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
09-10	Low	Yes	Yes	0	0	0	0	0	0	0	1	1	0
09-11	Low	Yes	Yes	0	0	0	0	0	0	0	1	1	0
09-12	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
09-13	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
09-14	Low	Yes	Yes	0	0	0	0	0	0	0	1	1	0
09-15	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
09-16	Low	Yes	Yes	0	0	0	0	0	0	0	1	1	0
09-20	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
09-21	Low	Yes	No	0	0	0	0	0	0	0	0	1	0

Town of Needham, MA

Outfalls, Interconnections Inventory and Initial Priority Ranking

Outfall/Sub basin/Interco nnection ID	Category (Problem, High, Low, Excluded)	Wet Weather Sample	Catchment Investigation Required*	System Vulnerability Factors (SVFs) (Yes=1, No=0)									
				History of SSOs?	Common storm & sanitary manholes?	Common trench construction of storm & sanitary sewers?(1)	Locations of storm drains crossing under sanitary sewer? (2)	Sanitary sewer constructed with an underdrain?(3)	Inadequate sanitary sewer LOS (regular surcharge /complaints)?	Areas formerly served by combined systems?	Sanitary sewer infrastructure defects identified through I/I investigations?(4)	Sewer Infrustr. >40 yrs old?	Widespread need for septic system upgrades?
09-22	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
09-23	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
10-01	Low	Yes	No	0	0	0	0	0	0	0	0	0	1
10-02	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
10-03	Low	Yes	Yes	0	0	0	0	0	0	0	0	1	0
10-04	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
10-05	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
10-06	Low	Yes	Yes	0	0	0	0	0	0	0	0	1	0
10-07	Low	Yes	Yes	0	0	0	0	0	0	0	0	1	0
10-08	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
10-09	Low	Yes	Yes	0	0	0	0	0	0	0	0	1	0
10-10	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
10-13	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
10-14	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
10-15	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
10-17	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
10-18	Low	Yes	Yes	0	0	0	0	0	0	0	0	1	0
10-20	Low	Yes	Yes	0	0	0	0	0	0	0	0	1	0
10-22	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
11-01/02	Low	Yes	Yes	0	0	0	0	0	0	0	0	1	0
11-03	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
11-04	Low	Yes	Yes	0	0	0	0	0	0	0	0	1	0
11-06	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
12-03	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
12-04	Low	Yes	Yes	0	0	0	0	0	0	0	1	1	0
12-06	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
12-07	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
12-08	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
12-09	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
12-10	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
12-11	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
12-12	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
12-13	Low	Yes	Yes	0	0	0	0	0	0	0	0	1	0
12-14	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
12-15	Low	Yes	Yes	0	0	0	0	0	0	0	0	1	0
12-17	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
12-20	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
13-01	Low	Yes	Yes	0	0	0	0	0	0	0	0	1	0
13-02	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
13-03	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
13-05	Low	Yes	Yes	0	0	0	0	0	1	0	0	1	0
13-06	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
13-07	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
13-08	Low	Yes	Yes	0	0	0	0	0	0	0	1	1	0
13-10	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
13-11	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
14-02	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
14-07	Low	Yes	No	0	0	0	0	0	0	0	0	0	1
14-08	Low	Yes	No	0	0	0	0	0	0	0	0	0	1

Town of Needham, MA

Outfalls, Interconnections Inventory and Initial Priority Ranking

Outfall/Sub basin/Interco nnection ID	Category (Problem, High, Low, Excluded)	Wet Weather Sample	Catchment Investigation Required*	System Vulnerability Factors (SVFs) (Yes=1, No=0)									
				History of SSOs?	Common storm & sanitary manholes?	Common trench construction of storm & sanitary sewers?(1)	Locations of storm drains crossing under sanitary sewer? (2)	Sanitary sewer constructed with an underdrain?(3)	Inadequate sanitary sewer LOS (regular surcharge /complaints)?	Areas formerly served by combined systems?	Sanitary sewer infrastructure defects identified through I/I investigations?(4)	Sewer Infrustr. >40 yrs old?	Widespread need for septic system upgrades?
14-09	Low	Yes	No	0	0	0	0	0	0	0	0	0	1
15-05	Low	Yes	Yes	0	0	0	0	0	0	0	1	1	0
15-09	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
15-10	Low	Yes	Yes	0	0	0	0	0	0	0	1	1	0
15-11	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
15-12	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
15-13	Low	Yes	Yes	0	0	0	0	0	0	0	1	1	0
15-14	Low	Yes	Yes	0	0	0	0	0	0	0	1	1	0
16-02	Low	Yes	Yes	0	0	0	0	0	0	0	0	0	1
I-03	Low	No	No	0	0	0	0	0	0	0	0	0	0
I-04	Low	Yes	Yes	0	0	0	0	0	0	0	0	1	0
01-01	Low	Yes	Yes	0	0	0	0	0	0	0	0	1	0
02-02	Low	Yes	No	0	0	0	0	0	0	0	0	0	1
02-04	Low	No	No	0	0	0	0	0	0	0	0	0	0
02-05	Low	No	No	0	0	0	0	0	0	0	0	0	0
02-06	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
02-10	Low	Yes	No	0	0	0	0	0	0	0	0	0	1
02-11	Low	Yes	No	0	0	0	0	0	0	0	0	0	1
02-12	Low	Yes	No	0	0	0	0	0	0	0	0	0	1
02-13	Low	Yes	No	0	0	0	0	0	0	0	0	0	1
02-14	Low	Yes	No	0	0	0	0	0	0	0	0	0	1
02-15	Low	Yes	No	0	0	0	0	0	0	0	0	0	1
02-16	Low	Yes	No	0	0	0	0	0	0	0	0	0	1
02-17	Low	Yes	Yes	0	0	0	0	0	0	0	0	0	1
02-18	Low	Yes	No	0	0	0	0	0	0	0	0	0	1
02-23	Low	Yes	Yes	0	0	0	0	0	0	0	0	0	1
02-24	Low	Yes	No	0	0	0	0	0	0	0	0	0	1
02-28	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
02-29	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
02-30	Low	Yes	No	0	0	0	0	0	0	0	0	0	1
02-31	Low	Yes	Yes	0	0	0	0	0	0	0	0	0	1
02-34	Low	Yes	No	0	0	0	0	0	0	0	0	0	1
02-45	Low	Yes	No	0	0	0	0	0	0	0	0	0	1
02-46	Low	Yes	No	0	0	0	0	0	0	0	0	0	1
02-47	Low	Yes	No	0	0	0	0	0	0	0	0	0	1
02-48/50	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
02-49	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
02-51	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
02-52	Low	Yes	No	0	0	0	0	0	0	0	0	0	1
03-10	Low	Yes	No	0	0	0	0	0	0	0	1	0	0
04-03	Low	No	Yes	0	0	0	0	0	0	0	0	0	0
04-05	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
04-06	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
04-09	Low	Yes	No	0	0	0	0	0	1	0	0	1	0
04-10	Low	Yes	Yes	0	0	0	0	0	0	0	1	1	0
04-11	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
04-12	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
04-13	Low	Yes	No	0	0	0	0	0	1	0	0	1	0
04-14	Low	Yes	No	0	0	0	0	0	1	0	0	1	0

Town of Needham, MA

Outfalls, Interconnections Inventory and Initial Priority Ranking

Outfall/Sub basin/Interco nnection ID	Category (Problem, High, Low, Excluded)	Wet Weather Sample	Catchment Investigation Required*	System Vulnerability Factors (SVFs) (Yes=1, No=0)									
				History of SSOs?	Common storm & sanitary manholes?	Common trench construction of storm & sanitary sewers?(1)	Locations of storm drains crossing under sanitary sewer? (2)	Sanitary sewer constructed with an underdrain?(3)	Inadequate sanitary sewer LOS (regular surcharge /complaints)?	Areas formerly served by combined systems?	Sanitary sewer infrastructure defects identified through I/I investigations?(4)	Sewer Infrustr. >40 yrs old?	Widespread need for septic system upgrades?
04-15	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
04-17	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
04-18	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
04-20	Low	Yes	Yes	0	0	0	0	0	1	0	1	1	0
04-21	Low	Yes	No	0	0	0	0	0	0	0	0	1	0
04-22	Low	No	No	0	0	0	0	0	0	0	0	0	0
04-23	Low	No	No	0	0	0	0	0	0	0	0	0	0
04-24	Low	Yes	Yes	0	0	0	0	0	1	0	1	1	0
06-03	Low	Yes	Yes	0	0	0	0	0	0	0	1	1	0
06-04	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
06-05	Low	Yes	Yes	0	0	0	0	0	0	0	1	1	0
07-02	Low	Yes	No	0	0	0	0	0	0	0	1	0	0
07-03	Low	Yes	No	0	0	0	0	0	0	0	1	0	0
07-04	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
07-05	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
07-06	Low	Yes	Yes	0	0	0	0	0	0	0	1	1	0
07-07	Low	Yes	Yes	0	0	0	0	0	0	0	1	1	0
07-08	Low	Yes	Yes	0	0	0	0	0	0	0	1	1	0
07-09	Low	Yes	No	0	0	0	0	0	0	0	1	1	0
07-10	Low	Yes	Yes	0	0	0	0	0	0	0	1	1	0
07-11	Low	Yes	Yes	0	0	0	0	0	0	0	1	1	0
09-01	Low	Yes	No	0	0	0	0	0	0	0	1	0	0
09-06	Low	Yes	No	0	0	0	0	0	0	0	1	0	0
09-17/18/19	Low	No	No	0	0	0	0	0	0	0	0	0	0
09-24	Low	Yes	No						0		0	1	0
09-25	Low	Yes	No						0		0	1	0
10-16	Low	No	No	0	0	0	0	0	0	0	0	0	0
10-19	Low	No	No	0	0	0	0	0	0	0	0	0	0
10-21	Low	No	No	0	0	0	0	0	0	0	0	0	0
11-07	Low	No	No	0	0	0	0	0	0	0	0	0	0
11-10	Low	No	No	0	0	0	0	0	0	0	0	0	0
14-01	Low	Yes	No	0	0	0	0	0	0	0	1	0	0
14-03	Low	No	No	0	0	0	0	0	0	0	0	0	0
14-04	Low	No	No	0	0	0	0	0	0	0	0	0	0
14-05/06	Low	No	No	0	0	0	0	0	0	0	0	0	0
15-01	Low	No	No	0	0	0	0	0	0	0	0	0	0
15-02	Low	Yes	No	0	0	0	0	0	0	0	1	0	0
15-03	Low	Yes	No	0	0	0	0	0	0	0	1	0	0
15-04	Low	Yes	No	0	0	0	0	0	0	0	1	0	0
15-06	Low	Yes	No	0	0	0	0	0	0	0	1	0	0
15-07	Low	Yes	Yes	0	0	0	0	0	0	0	1	0	0
15-08	Low	Yes	No	0	0	0	0	0	0	0	1	0	0
16-01	Low	No	No	0	0	0	0	0	0	0	0	0	0
I-02	Low	No	No	0	0	0	0	0	0	0	0	0	0
01-02	Low	No	No	0	0	0	0	0	0	0	0	0	0
01-03	Low	No	No	0	0	0	0	0	0	0	0	0	0
01-07	Low	No	No	0	0	0	0	0	0	0	0	0	0
01-08	Low	No	No	0	0	0	0	0	0	0	0	0	0
02-07	Low	No	No	0	0	0	0	0	0	0	0	0	0

Town of Needham, MA

Outfalls, Interconnections Inventory and Initial Priority Ranking

Outfall/Sub basin/Interco nnection ID	Category (Problem, High, Low, Excluded)	Wet Weather Sample	Catchment Investigation Required*	System Vulnerability Factors (SVFs) (Yes=1, No=0)									
				History of SSOs?	Common storm & sanitary manholes?	Common trench construction of storm & sanitary sewers?(1)	Locations of storm drains crossing under sanitary sewer? (2)	Sanitary sewer constructed with an underdrain?(3)	Inadequate sanitary sewer LOS (regular surcharge /complaints)?	Areas formerly served by combined systems?	Sanitary sewer infrastructure defects identified through I/I investigations?(4)	Sewer Infrustr. >40 yrs old?	Widespread need for septic system upgrades?
02-08	Low	No	No	0	0	0	0	0	0	0	0	0	0
02-09	Low	No	No	0	0	0	0	0	0	0	0	0	0
02-32	Low	No	No	0	0	0	0	0	0	0	0	0	0
02-33	Low	No	No	0	0	0	0	0	0	0	0	0	0
02-35	Low	No	No	0	0	0	0	0	0	0	0	0	0
02-36	Low	No	No	0	0	0	0	0	0	0	0	0	0
02-37	Low	No	No	0	0	0	0	0	0	0	0	0	0
02-38	Low	No	No	0	0	0	0	0	0	0	0	0	0
02-39/40	Low	No	No	0	0	0	0	0	0	0	0	0	0
02-41	Low	No	No	0	0	0	0	0	0	0	0	0	0
02-42	Low	No	No	0	0	0	0	0	0	0	0	0	0
02-43	Low	No	No	0	0	0	0	0	0	0	0	0	0
02-44	Low	No	No	0	0	0	0	0	0	0	0	0	0
02-53	Low	No	No	0	0	0	0	0	0	0	0	0	0
04-02	Low	No	No	0	0	0	0	0	0	0	0	0	0
I-01	Interconnect In	Yes	Yes	0	0	0	0	0	0	0	0	0	0
I-06	Interconnect In	Yes	No	0	0	0	0	0	0	0	0	0	0
I-07	Interconnect In	Yes	No	0	0	0	0	0	0	0	0	0	0
I-08	Interconnect In	Yes	No	0	0	0	0	0	0	0	0	1	0

* Catchment investigation required if a junction fed by two legs, each of length 300' or more, is located within the catchment or feeds into the catchment.

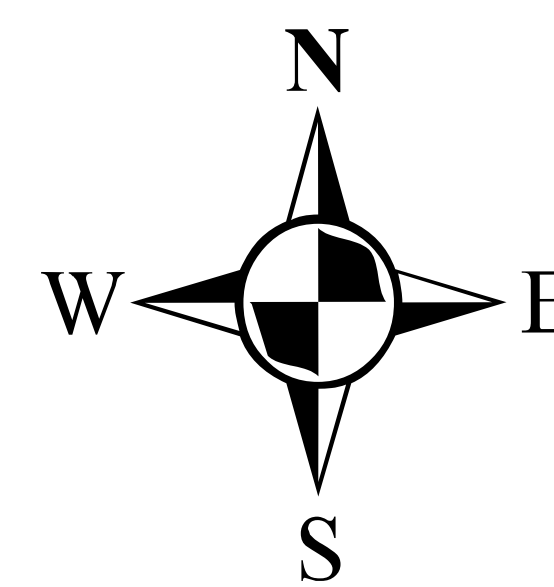
(3) There are known underdrains but most are plugged

(4) Use DEP criteria - areas with greater than 4,000 gpd/in-mi identified in the Phase 1 I/I study were considered higher vulnerability

APPENDIX C – IDDE Composite Ranking and Sampling Locations Map

Town of Needham, Massachusetts

IDDE Composite Ranking Map



Map Legend

Conveyance

Pipe (Flow Direction)

Drain_Outfall

Hydrography

Hydrologic Connection

Open Water

Wetland

Major Watershed Boundary

*MassDEP 2014 Integrated List of Waters

Rivers: Category 4A

Lakes, Estuaries: Category 4A

Rivers: Category 4C

Lakes, Estuaries: Category 4C

Rivers: Category 5

Lakes, Estuaries: Category 5

Subwatersheds 2015

Composite Priority Ranking

1 (low)

2

3

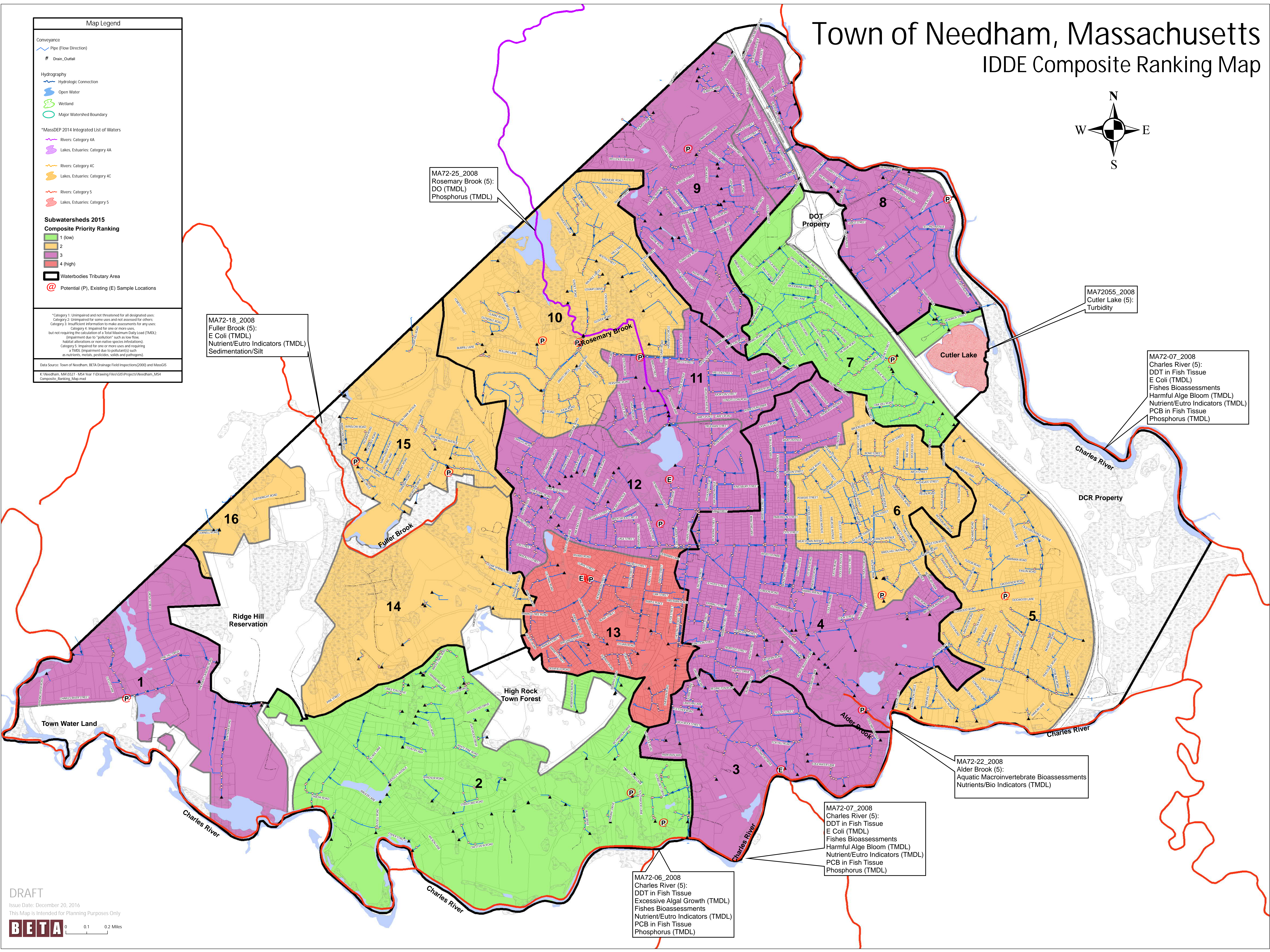
4 (high)

Waterbodies Tributary Area

Potential (P), Existing (E) Sample Locations

*Category 1: Unimpaired and not threatened for all designated uses;
Category 2: Unimpaired for some uses and not assessed for others;
Category 3: Insufficient information to make assessments for any uses;
Category 4: Impaired for one or more uses,
but not requiring the calculation of a Total Maximum Daily Load (TMDL);
Impairment due to "pollution" such as low flow,
habitat alterations or non-native species infestations;
Category 5: Impaired for one or more uses and requiring
a TMDL (impairment due to pollutant(s) such
as nutrients, metals, pesticides, solids and pathogens).

Data Source: Town of Needham, BETA Drainage Field Inspections(2009) and MassGIS
K:\Needham_MASS217_M54 Year 1\Drawing Files\GIS\Projects\Needham_M54
Composite_Ranking_Map.mxd



MA72-18_2008
Fuller Brook (5):
E Coli (TMDL)
Nutrient/Eutro Indicators (TMDL)
Sedimentation/Silt

MA72-25_2008
Rosemary Brook (5):
DO (TMDL)
Phosphorus (TMDL)

MA72055_2008
Cutler Lake (5):
Turbidity

MA72-07_2008
Charles River (5):
DDT in Fish Tissue
E Coli (TMDL)
Fishes Bioassessments
Harmful Alge Bloom (TMDL)
Nutrient/Eutro Indicators (TMDL)
PCB in Fish Tissue
Phosphorus (TMDL)

MA72-22_2008
Alder Brook (5):
Aquatic Macroinvertebrate Bioassessments
Nutrients/Bio Indicators (TMDL)

MA72-07_2008
Charles River (5):
DDT in Fish Tissue
E Coli (TMDL)
Fishes Bioassessments
Harmful Alge Bloom (TMDL)
Nutrient/Eutro Indicators (TMDL)
PCB in Fish Tissue
Phosphorus (TMDL)

MA72-06_2008
Charles River (5):
DDT in Fish Tissue
Excessive Algal Growth (TMDL)
Fishes Bioassessments
Nutrient/Eutro Indicators (TMDL)
PCB in Fish Tissue
Phosphorus (TMDL)

APPENDIX D- Screening/Sampling Standard Operating Procedures and Forms

Appendix D – Stormwater Sampling SOPs

SOP – Field Screening and Water Quality Measurements

1.0 Scope and Application

This standard operating procedure (SOP) was prepared for the collection of storm water sampling as required by the Massachusetts MS4 General Permit. The SOP outlines procedures to:

- Collect field water quality measurements
- Screen for the presence of ammonia, surfactants and residual chlorine using field test kits; and
- Collect samples for laboratory analysis for e.coli or enterococcus along with identified pollutants of concern for that catchment. Per the MS4 permit, the pollutant of concern is identified as the compound causing the impairment and shall be sampled for the requirements outlined in Appendix G of the permit.

2.0 Outfall Sampling Requirements

Dry weather flow shall be sampled for the parameters summarized in the table below along with pollutant of concern.

Massachusetts MS4 Permit Monitoring Requirements								
For Discharges into Impaired Waters – Parameters and Methods per MA MS4 Permit Section 2.3.4.7 Screening Requirements								
Analysis	Monitoring Parameter	EPA or Approved Method No.	Field Test Kit	Field Instrument	Lab	Required MDL	Field Instrument	range
Ammonia (Un-ionized)	Ammonia – Nitrogen	350.1	x				Hach NI-SA (Fresh or saltwater) or Hach test strips (freshwater only)	0-2.5 mg/l
Chlorine			x			0.02 mg/l	Hach CN 80	0-10mg/l
Conductivity				x			YSI 556 (rental)	
Surfactant (MBAS)	MBAS		x			0.25 mg/l	Chemetrics K-9400	0-3 mg/l
pH, High	pH	150.2		x			YSI 556	
pH, Low	pH	150.2		x			YSI 556	
Temperature, water	NMR	---		x			YSI 556	
Salinity	Specific Conductance	120.1		x			YSI 556	
Enterococcus	Enterococcus (Marine water)	1106.1; 1600; Enterolert® 12 22.			x			
Escherichia coli	E. coli (freshwater)	1103.1; 1603; Colilert® 12 16, Colilert-18® 12 15 16.; mColiBlue-24® 17.			x			
Notes:								
NMR® indicates no monitoring required								
"Total Phosphorus (freshwater)" indicates monitoring required for total phosphorus where stormwater discharges to a water body that is freshwater								
"Total Nitrogen (marine water)" indicates monitoring required for total nitrogen where stormwater discharges to a water body that is a marine or estuarine water								
Does not include "Pollutants of Concern" where discharge is directly into a water body with an approved TMDL								

Appendix D – Stormwater Sampling SOPs

3.0 Equipment Inspection, Maintenance, and Calibration

- The field test kit reagents have expiration dates (the surfactant test kit has the shortest expiration date (5 months)). One month prior to initiating a sampling program check all expiration dates and order as needed. Dispose of expired test kits per manufacturer instruction.
- Prior to each sampling event, each of the test kits will be inspected to ensure the availability of testing materials (Hach strips, reagents, etc.).
- Instructions for each test kit is attached. A laminated version of the test kit instructions has been made and should be used in the field.
- Calibration of the YSI is completed by the rental company (US Environmental). Calibration checks on the YSI meters and colorimeter will be performed by the Field Team prior to each sampling event with the equipment being re-adjusted as needed in accordance to manufacturer's instructions.

4.0 MSDS Sheets and Waste Management

MSDS Sheets for each of the field test kits is attached. Active Ingredients for each field test kit is listed below, however, the MSDS sheet should be reviewed for hazards, proper personal protective equipment (PPE) and waste management as part of the training to use these test kits.

Chemetrics K-9400 Surfactant Screening kit: Reagents include chloroform, sodium phosphate, sulfuric acid and methylene blue

Hach NI-SA ammonia test kit: Reagents contain 3-7% sodium hydroxide

Hach CN-80 total and residual chlorine test kit: Reagents include sodium phosphate, potassium iodide, DPD salt, glycine and disodium EDTA.

During field testing, reagent waste will be placed in a 1-liter amber jar labeled "Waste" and brought back to the office for disposal.

5.0 Field Measurement Procedure

- Whenever possible, the field measurements will be taken at the center of the discharge flow, at half of the depth and upstream of the sample collector. For the YSI meter, care will be taken not to allow the probe to contact any accumulated sediment.
- The sample collection point, collection conditions, and accessibility will be noted on the field data sheet.
- Equipment will be cleaned following each sampling location.

Appendix D – Stormwater Sampling SOPs

6.0 Sample Collection Procedures

Procedures for collecting a grab sample are summarized below:

- Do not eat or drink during sample collection and processing.
- Do not collect or process samples near a running vehicle.
- Always wear clean, powder-free nitrile gloves when handling sample containers and lids.
- Depending on the analysis, preservatives (e.g. sulfuric acid, hydrochloric acid) are added to some sample containers by the lab. Never touch the inside surface of a sample container or lid, even with gloved hands. Do not dump out the preservative or overfill the sample containers.
- Slowly lower the bottle into the water to avoid bottom disturbance and stirring up sediment.
- Label the sample with the time and sample ID.

7.0 Analytical Methods and Holding Times

Check holding times for the requested analytical. Note that the lab needs sufficient time to extract and process the sample. Due to short holding time the lab needs any samples that are to be analyzed for e.coli, fecal coliform, or enterococcus within 6 hours of collection. Record the time that the bacteria samples were collected. A summary of the laboratory holding times is provided below.

Table 1: Parameter specifications

Parameter (lab - equipment)	Preservation	Holding time
PH (YSI)	None	Immediate
Temperature (YSI)	None	Immediate
Sp Cond (YSI)	None	Immediate
DO (YSI)	None	Immediate
Total Phosphorus	H2SO4 (pH <2) + Ice	28 days
TSS	Ice	7 days
BOD	Ice	48 hours
Surfactants (field kit – Chemetrics)	None	Immediate
Ammonia (field kit NI-SA or test strips)	None	Immediate
TPH Petroleum ID (alpha)	Ice	7 Days to extraction 40 days after extraction
E. Coli (EPA)	Ice	6 hrs to lab
Enterococcus (EPA)	Ice	6 hrs to lab
Chlorine (Field kit – Hach)	None	Immediate

Appendix D – Stormwater Sampling SOPs

8.0 Data Evaluation

Evaluation of the data should include a review for potential positive results due to sources other than human wastewater, and for false negative results due to chemical action or interferences.

As described in the EPA New England Bacterial Source Tracking Protocol:

- “In the EPA-NE region, field sampling has indicated that the biological breakdown of organic material in historically filled tidal wetlands may cause elevated ammonia readings, as can the discharge from many landfills.
- Salinity levels greater than 1 part per thousand may cause elevated surfactant readings, the presence of oil may likewise indicate elevated levels, and fine suspended particulate matter may cause inconclusive surfactant readings (for example, the indicator ampule may turn green instead of a shade of blue).
- Elevated chlorine from leaking drinking water infrastructure or contained in the illicit wastewater discharge may inhibit bacterial growth and cause very low bacterial concentrations. Any detection of total chlorine above the instrument Reporting Limit should be noted.”

The following table was obtained from the EPA IDDE Guidance Manual, 2004.

Table 39: Indicator Parameters Used to Detect Illicit Discharges					
Parameter	Discharge Types It Can Detect				Laboratory/Analytical Challenges
	Sewage	Washwater	Tap Water	Industrial or Commercial Liquid Wastes	
Ammonia	●	⊙	○	⊙	Can change into other nitrogen forms as the flow travels to the outfall
Boron	⊙	⊙	○	N/A	
Chlorine	○	○	○	⊙	High chlorine demand in natural waters limits utility to flows with very high chlorine concentrations
Color	⊙	⊙	○	⊙	
Conductivity	⊙	⊙	○	⊙	Ineffective in saline waters
Detergents – Surfactants	●	●	○	⊙	Reagent is a hazardous waste
<i>E. coli</i> Enterococci Total Coliform	⊙	○	○	○	24-hour wait for results Need to modify standard monitoring protocols to measure high bacteria concentrations
Fluoride*	○	○	●	⊙	Reagent is a hazardous waste Exception for communities that do not fluoridate their tap water
Hardness	⊙	⊙	⊙	⊙	
pH	○	⊙	○	⊙	
Potassium	⊙	○	○	●	May need to use two separate analytical techniques, depending on the concentration
Turbidity	⊙	⊙	○	⊙	

● Can almost always (>80% of samples) distinguish this discharge from clean flow types (e.g., tap water or natural water). For tap water, can distinguish from natural water.
 ⊙ Can sometimes (>50% of samples) distinguish this discharge from clean flow types depending on regional characteristics, or can be helpful in combination with another parameter
 ○ Poor indicator. Cannot reliably detect illicit discharges, or cannot detect tap water
 N/A: Data are not available to assess the utility of this parameter for this purpose.
 Data sources: Pitt (this study)
 *Fluoride is a poor indicator when used as a single parameter, but when combined with additional parameters (such as detergents, ammonia and potassium), it can almost always distinguish between sewage and washwater.

Stormwater Monitoring Field Equipment List

Field Equipment

- ☐ Log book
- ☐ COC forms
- ☐ Laminated field test kit Instructions
- ☐ Sample Bottles- See attached sampling chart
- ☐ Coolers with Ice
- ☐ Sharpies
- ☐ Pens
- ☐ Paper towels
- ☐ Wet Wipes
- ☐ Sampling plan
- ☐ Nitrile Gloves
- ☐ Squirt bottle of DI Water
- ☐ Waders/Boots
- ☐ Telescopic pole and dipper cups

- ☐ YSI multi parameter Meter
- ☐ Turbidimeter (If required per App G requirements)

- ☐ Hach Ammonia test kit (NI-SA) (salt or freshwater)
- ☐ Hach Ammonia Test strips (freshwater only)
- ☐ Chemetrics K-9400 Surfactant test kit
- ☐ Hach CN80 residual chlorine test kit

- ☐ Waste Container for field test kits (1 amber liter clearly labeled waste)

References

YSI Pro 30 Users Manual (2011) <https://www.ysi.com/File%20Library/Documents/I1Pro30-Manual-English.pdf>

Chemtrics Instructions [http://www.chemetrics.com/Detergents+\(anionic+surfactants, 9400/R-9400](http://www.chemetrics.com/Detergents+(anionic+surfactants, 9400/R-9400)

Hach test strips <http://www.hach.com/teststrips>

BETA Group Inc. Stormwater Inventory Outfall

Screening/Sampling Form

Municipality Name:

General Data

Outfall ID:

Inspection Date:

Inspection Time

Inspector:

Weather:

Clear

Cloudy

Rain

Snow

Able to Access:

Yes

No

Outfall Environmental Inspection

Surrounding Area:

Residential

Commercial

Industrial

Municipal

Open Space

Unknown

Outfall Flowing To:

Bay

Lake

Land

Marsh

Pond

River

Stream

Wetland

Structure Under Water:

Yes

No

Outfall Flow Amount:

Drip

Moderate

None

Substantial

Trickle

Outfall Flow Clarity:

Clear

Cloudy

None

Opaque

Outfall Flow Color:

Sediment

Yes

No

Scouring

Yes

No

Algae Growth:

Yes

No

Stressed Vegetation:

Yes

No

Staining:

Yes

No

Floatables:

Yes

No

Oil Sheen:

Yes

No

Odor:

None

Sewer

Eggs

Fuel

Laundry

Sewage

Turbidity:

Yes

No

Outfall Sampling

Sampling Required?

Yes

No

Sampling Performed?

Yes

No

Structure Where Sampling Was Performed

Outfall

MH

CB

Other

Structure ID If Not Outfall:

Ammonia Reading:

Salinity Reading:

Temperature Reading

Chlorine Reading:

pH Reading:

Conductivity Reading

Surfactant Reading

Detergents CHEMets Kit

K-9400/R-9400: 0 - 3 ppm

Test Procedure

1. Rinse the reaction tube with the sample to be tested, and then fill it to the 5 mL mark with the sample.
2. While holding the double-tipped ampoule in a vertical position, snap the upper tip using the tip breaking tool (fig. 1).
3. Invert the ampoule and position the open end over the reaction tube. Snap the upper tip and allow the contents to drain into the reaction tube (fig. 1).
4. Cap the reaction tube and shake it vigorously for **30 seconds**. Allow the tube to stand undisturbed for **1 minute**.
5. Make sure that the flexible tubing is firmly attached to the CHEMet ampoule tip.
6. Insert the CHEMet assembly (tubing first) into the reaction tube making sure that the end of the flexible tubing is at the bottom of the tube. Break the tip of the CHEMet ampoule by gently pressing it against the side of the reaction tube (fig. 2). The ampoule should draw in fluid only from the organic phase (bottom layer).
7. When filling is complete, remove the CHEMet assembly from the reaction tube.
8. Remove the flexible tubing from the CHEMet ampoule and wipe all liquid from the exterior of the ampoule. Place an ampoule cap firmly onto the tip of the CHEMet ampoule. Invert the ampoule several times, allowing the bubble to travel from end to end.

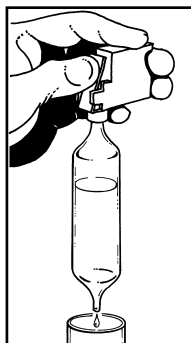


Figure 1

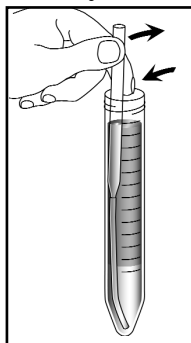


Figure 2

9. Obtain a test result by placing the ampoule, flat end first, into the comparator. Hold the comparator up toward a source of light and view from the bottom. Rotate the comparator until the best color match is found (fig. 3).

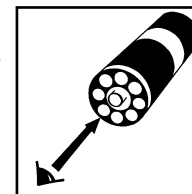


Figure 3

Tip Breaker

The tip breaker opens for easy disposal of the glass tips (pull lever away from body of tip breaker or pull open the side wall). The tip breaker will work most effectively if the tips are emptied out frequently.

Test Method

The Detergents CHEMets®¹ test kit employs the methylene blue extraction method^{2,3,4}. Anionic detergents react with methylene blue to form a blue complex that is extracted into an immiscible organic solvent. The intensity of the blue color is directly related to the concentration of "methylene blue active substances (MBAS)" in the sample. Anionic detergents are one of the most prominent methylene blue active substances. Test results are expressed in ppm (mg/Liter) linear alkylbenzene sulfonate (equivalent weight 325).

1. CHEMets is a registered trademark of CHEMetrics, Inc. U.S. Patent No. 3,634,038
2. APHA Standard Methods, 22nd ed., Method 5540 C - 2000
3. EPA Methods for Chemical Analysis of Water and Wastes, Method 425.1 (1983)
4. ASTM D 2330-02, Methylene Blue Active Substances

Safety Information

Read SDS (available at www.chemetrics.com) before performing this test procedure. Wear safety glasses and protective gloves.



Simplicity in Water Analysis

www.chemetrics.com

4295 Catlett Road, Midland, VA 22728 U.S.A.

Phone: (800) 356-3072; Fax: (540) 788-4856

E-Mail: orders@chemetrics.com

Feb. 18, Rev. 10

Scroll down for all Safety Data Sheets (SDS) for this product.

Total Enclosures: 2



Simplicity in Water Analysis

Cover Page for Safety Data Sheet

Thank you for choosing CHEMetrics, Inc. We appreciate your business. In order to best serve your needs for accurate and complete Safety Data, we offer the following information as supplemental to the attached SDS.

SDS No.: R9402

Version No.: 3.6

Product Name: Double-Tipped Ampoules for Detergents CHEMets® Kit and Refill and for Detergents Instrumental Test

Components of water analysis reagent sets: Refills R-9400, R-9423; and Kits I-2017, K-9400

Product Descriptions:

Double-Tipped Ampoules: Glass ampoules with dual tapered tips. Each double-tipped ampoule in K-9400 and R-9400 contains approximately 4 mL of liquid reagent. Each double-tipped ampoule in R-9423 contains approximately 9.5 mL of liquid reagent. Refills and test kits contain 20 double-tipped ampoules.

Addendum to Section 14 Transport Information:

Shipping container markings and labels for this product, as received, may vary from the contents of section 14 of the SDS for one or both of the following reasons:

- CHEMetrics has packaged this product as Dangerous Goods in Excepted Quantities according to IATA, US DOT, and IMDG regulations.
- CHEMetrics has packaged this product as part of a test kit or reagent set composed of various chemical reagents and elected to ship as UN 3316 Chemical Kit, Hazard Class 9, Packing Group II or III.

In case of reshipment, it is the responsibility of the shipper to determine appropriate labels and markings in accordance with applicable transportation regulations.

Additional Information:

- "Print Date" = Revision Date (expressed as DD/MM/YYYY)
- Test kits and reagents sets may contain additional chemical reagents. See separate SDS(s).

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Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

CHEMetrics, Inc.

Chemwatch: 9-87557

SDS No: R9402

Version No: 3.6

Safety Data Sheet according to OSHA HazCom Standard (2012) requirements

Chemwatch Hazard Alert Code:

Issue Date: 03/02/2018

Print Date: 03/02/2018

Initial Date: 03/02/2018

S.GHS.USA.EN

SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

Product Identifier

Product name	Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test
Synonyms	Not Available
Proper shipping name	Chemical kits; First aid kits
Chemical formula	Not Applicable
Other means of identification	Not Available
CAS number	Not Applicable

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Component of water analysis reagent sets: Refills R-9400, R-9423 and Kits I-2017, K-9400
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Details of the supplier of the safety data sheet

Registered company name	CHEMetrics, Inc.
Address	4295 Catlett Road, Midland VA 22728 - United States
Telephone	1-540-788-9026
Fax	1-540-788-4856
Website	www.chemetrics.com
Email	technical@chemetrics.com

Emergency telephone number

Association / Organisation	ChemTel, Inc.
Emergency telephone numbers	1-800-255-3924
Other emergency telephone numbers	+01-813-248-0585

SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

Classification	Acute Toxicity (Oral) Category 4, Acute Toxicity (Inhalation) Category 3, Skin Corrosion/Irritation Category 2, Serious Eye Damage Category 1, Carcinogenicity Category 2, Reproductive Toxicity Category 2, Specific target organ toxicity - repeated exposure Category 2
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Label elements

Hazard pictogram(s)	
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SIGNAL WORD

DANGER

Hazard statement(s)

H302	Harmful if swallowed.
H331	Toxic if inhaled.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H351	Suspected of causing cancer.
H361	Suspected of damaging fertility or the unborn child.
H373	May cause damage to organs through prolonged or repeated exposure.

Continued...

Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

Precautionary statement(s) Prevention

P201	Obtain special instructions before use.
P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P271	Use in a well-ventilated area.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P281	Use personal protective equipment as required.
P270	Do not eat, drink or smoke when using this product.

Precautionary statement(s) Response

P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308+P313	IF exposed or concerned: Get medical advice/attention.
P310	Immediately call a POISON CENTER or doctor/physician.
P362	Take off contaminated clothing and wash before reuse.
P304+P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P301+P312	IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P302+P352	IF ON SKIN: Wash with plenty of soap and water.
P330	Rinse mouth.
P332+P313	If skin irritation occurs: Get medical advice/attention.

Precautionary statement(s) Storage

P403+P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.

Precautionary statement(s) Disposal

P501	Dispose of contents/container in accordance with local regulations.
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SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
67-66-3	71	<u>chloroform</u>
7732-18-5	26	<u>water</u>
13472-35-0	2	<u>sodium phosphate, monobasic, dihydrate</u>
7664-93-9	1	<u>sulfuric acid</u>
61-73-4	<0.1	<u>methylene blue</u>
Not Available	<0.1	Proprietary ingredient

SECTION 4 FIRST AID MEASURES

Description of first aid measures

General	
Eye Contact	<p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> ▶ Immediately hold eyelids apart and flush the eye continuously with running water. ▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▶ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. ▶ Transport to hospital or doctor without delay. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	<p>If skin contact occurs:</p> <ul style="list-style-type: none"> ▶ Immediately remove all contaminated clothing, including footwear. ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation.
Inhalation	<ul style="list-style-type: none"> ▶ If fumes or combustion products are inhaled remove from contaminated area. ▶ Lay patient down. Keep warm and rested. ▶ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures. ▶ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary. ▶ Transport to hospital, or doctor, without delay.
Ingestion	<p>NOTE: IN massive chloroform overdose, DO NOT INDUCE EMESIS because of the rapid onset of CNS depression and the risk of aspiration</p> <p>If poisoning occurs, contact a doctor or Poisons Information Centre.</p> <ul style="list-style-type: none"> ▶ Avoid giving milk or oils. ▶ Avoid giving alcohol. ▶ If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.

Continued...

Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

- ▶ If swallowed do **NOT** induce vomiting.
- ▶ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- ▶ Observe the patient carefully.
- ▶ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
- ▶ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- ▶ Seek medical advice.

Most important symptoms and effects, both acute and delayed

See Section 11

Indication of any immediate medical attention and special treatment needed

For chloroform intoxications:

Chloroform concentrations may be determined in blood.

Treat irritation symptomatically.

Oral Management:

Chloroform is radiopaque and X-rays confirm ingestion.

DO NOT INDUCE EMESIS because of the rapid onset of CNS depression and the risk of aspiration.

Consider gastric lavage within 1 hour of ingestion because of very rapid absorption of chloroform (use cuffed ET tube to protect airway)

Contact a poisons information service for further guidance on gut decontamination.

Systematic Management.

All patients initially require at least 24 hours observation with ECG monitoring.

Patients should be kept at complete bed rest, the use of stimulants (including adrenaline and noradrenaline) should be avoided because of the risk of sensitisation of the myocardium.

In symptomatic patients the hepatic and renal function should be monitored for at least 3-days post-exposure.

Chest X-rays will be necessary to monitor development of respiratory complications.

Chloroform depletes glutathione stores; N-acetylcysteine (used in the treatment of paracetamol overdose) has been suggested as a possible antidote for hepatotoxic organic solvents (success in carbon tetrachloride intoxications has been reported).

for intoxication due to Freons/ Halons;

A: Emergency and Supportive Measures

- ▶ Maintain an open airway and assist ventilation if necessary
- ▶ Treat coma and arrhythmias if they occur. Avoid (adrenaline) epinephrine or other sympathomimetic amines that may precipitate ventricular arrhythmias. Tachyarrhythmias caused by increased myocardial sensitisation may be treated with propranolol, 1-2 mg IV or esmolol 25-100 microgm/kg/min IV.
- ▶ Monitor the ECG for 4-6 hours

B: Specific drugs and antidotes:

- ▶ There is no specific antidote

C: Decontamination

- ▶ Inhalation; remove victim from exposure, and give supplemental oxygen if available.
- ▶ Ingestion; (a) Prehospital: Administer activated charcoal, if available. **DO NOT** induce vomiting because of rapid absorption and the risk of abrupt onset CNS depression. (b) Hospital: Administer activated charcoal, although the efficacy of charcoal is unknown. Perform gastric lavage only if the ingestion was very large and recent (less than 30 minutes)

D: Enhanced elimination:

- ▶ There is no documented efficacy for diuresis, haemodialysis, haemoperfusion, or repeat-dose charcoal.

POISONING and DRUG OVERDOSE, Californian Poison Control System Ed. Kent R Olson; 3rd Edition

- ▶ Do not administer sympathomimetic drugs unless absolutely necessary as material may increase myocardial irritability.
- ▶ No specific antidote.
- ▶ Because rapid absorption may occur through lungs if aspirated and cause systematic effects, the decision of whether to induce vomiting or not should be made by an attending physician.
- ▶ If lavage is performed, suggest endotracheal and/or esophageal control.
- ▶ Danger from lung aspiration must be weighed against toxicity when considering emptying the stomach.
- ▶ Treatment based on judgment of the physician in response to reactions of the patient

For acute or short term repeated exposures to strong acids:

- ▶ Airway problems may arise from laryngeal edema and inhalation exposure. Treat with 100% oxygen initially.
- ▶ Respiratory distress may require cricothyroidotomy if endotracheal intubation is contraindicated by excessive swelling
- ▶ Intravenous lines should be established immediately in all cases where there is evidence of circulatory compromise.
- ▶ Strong acids produce a coagulation necrosis characterised by formation of a coagulum (eschar) as a result of the dessicating action of the acid on proteins in specific tissues.

INGESTION:

- ▶ Immediate dilution (milk or water) within 30 minutes post ingestion is recommended.
- ▶ **DO NOT attempt to neutralise the acid since exothermic reaction may extend the corrosive injury.**
- ▶ Be careful to avoid further vomit since re-exposure of the mucosa to the acid is harmful. Limit fluids to one or two glasses in an adult.
- ▶ Charcoal has no place in acid management.
- ▶ Some authors suggest the use of lavage within 1 hour of ingestion.

SKIN:

- ▶ Skin lesions require copious saline irrigation. Treat chemical burns as thermal burns with non-adherent gauze and wrapping.
- ▶ Deep second-degree burns may benefit from topical silver sulfadiazine.

EYE:

- ▶ Eye injuries require retraction of the eyelids to ensure thorough irrigation of the conjunctival cul-de-sacs. Irrigation should last at least 20-30 minutes. **DO NOT use neutralising agents or any other additives.** Several litres of saline are required.
- ▶ Cycloplegic drops, (1% cyclopentolate for short-term use or 5% homatropine for longer term use) antibiotic drops, vasoconstrictive agents or artificial tears may be indicated dependent on the severity of the injury.
- ▶ Steroid eye drops should only be administered with the approval of a consulting ophthalmologist).

[Ellenhorn and Barceloux: Medical Toxicology]

SECTION 5 FIREFIGHTING MEASURES

Extinguishing media

- ▶ Water spray or fog.
- ▶ Foam.
- ▶ Dry chemical powder.
- ▶ BCF (where regulations permit).
- ▶ Carbon dioxide.

Special hazards arising from the substrate or mixture

Fire Incompatibility

- ▶ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result

Advice for firefighters

Continued...

Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

Fire Fighting	<ul style="list-style-type: none"> ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus plus protective gloves. ▶ Prevent, by any means available, spillage from entering drains or water courses. ▶ Use fire fighting procedures suitable for surrounding area. ▶ DO NOT approach containers suspected to be hot. ▶ Cool fire exposed containers with water spray from a protected location. ▶ If safe to do so, remove containers from path of fire. ▶ Equipment should be thoroughly decontaminated after use.
Fire/Explosion Hazard	<ul style="list-style-type: none"> ▶ Non combustible. ▶ Not considered to be a significant fire risk. ▶ Acids may react with metals to produce hydrogen, a highly flammable and explosive gas. ▶ Heating may cause expansion or decomposition leading to violent rupture of containers. ▶ May emit corrosive, poisonous fumes. May emit acrid smoke. <p>carbon dioxide (CO₂) hydrogen chloride phosgene other pyrolysis products typical of burning organic material. May emit poisonous fumes.</p>

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Minor Spills	<ul style="list-style-type: none"> ▶ Clean up all spills immediately. ▶ Avoid breathing vapours and contact with skin and eyes. ▶ Control personal contact with the substance, by using protective equipment. ▶ Contain and absorb spill with sand, earth, inert material or vermiculite. ▶ Wipe up. ▶ Place in a suitable, labelled container for waste disposal.
Major Spills	<ul style="list-style-type: none"> ▶ Clear area of personnel and move upwind. ▶ Alert Fire Brigade and tell them location and nature of hazard. ▶ Wear breathing apparatus plus protective gloves. ▶ Prevent, by any means available, spillage from entering drains or water courses. ▶ No smoking, naked lights or ignition sources. ▶ Increase ventilation. ▶ Stop leak if safe to do so. ▶ Water spray or fog may be used to disperse / absorb vapour. ▶ Contain or absorb spill with sand, earth or vermiculite. ▶ Collect recoverable product into labelled containers for recycling. ▶ Collect solid residues and seal in labelled drums for disposal. ▶ Wash area and prevent runoff into drains. ▶ After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using. ▶ If contamination of drains or waterways occurs, advise emergency services.
	<p>Personal Protective Equipment advice is contained in Section 8 of the SDS.</p>

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling	<ul style="list-style-type: none"> ▶ Avoid all personal contact, including inhalation. ▶ Wear protective clothing when risk of exposure occurs. ▶ Use in a well-ventilated area. ▶ Prevent concentration in hollows and sumps. ▶ DO NOT enter confined spaces until atmosphere has been checked. ▶ DO NOT allow material to contact humans, exposed food or food utensils. ▶ Avoid contact with incompatible materials. ▶ When handling, DO NOT eat, drink or smoke. ▶ Keep containers securely sealed when not in use. ▶ Avoid physical damage to containers. ▶ Always wash hands with soap and water after handling. ▶ Work clothes should be laundered separately. Launder contaminated clothing before re-use. ▶ Use good occupational work practice. ▶ Observe manufacturer's storage and handling recommendations contained within this SDS. ▶ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained. <p>Wear impact- and splash-resistant eyewear.</p>
Other information	<ul style="list-style-type: none"> ▶ Store in original containers. ▶ Keep containers securely sealed. ▶ Store in a cool, dry, well-ventilated area. ▶ Store away from incompatible materials and foodstuff containers. ▶ Protect containers against physical damage and check regularly for leaks. ▶ Observe manufacturer's storage and handling recommendations contained within this SDS. <p>For optimum analytical performance, store in the dark and at room temperature.</p>

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> ▶ DO NOT use aluminium or galvanised containers ▶ Lined metal can, lined metal pail/ can. ▶ Plastic pail. ▶ Polyliner drum. ▶ Packing as recommended by manufacturer. ▶ Check all containers are clearly labelled and free from leaks.
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Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

	<p>For low viscosity materials</p> <ul style="list-style-type: none"> Drums and jerricans must be of the non-removable head type. Where a can is to be used as an inner package, the can must have a screwed enclosure. <p>For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids (between 15 C deg. and 40 deg C.):</p> <ul style="list-style-type: none"> Removable head packaging; Cans with friction closures and low pressure tubes and cartridges <p>may be used.</p> <p>-</p> <p>Where combination packages are used, and the inner packages are of glass, there must be sufficient inert cushioning material in contact with inner and outer packages *.</p> <p>-</p> <p>In addition, where inner packagings are glass and contain liquids of packing group I and II there must be sufficient inert absorbent to absorb any spillage *.</p> <p>-</p> <p>* unless the outer packaging is a close fitting moulded plastic box and the substances are not incompatible with the plastic.</p> <p>All inner and sole packagings for substances that have been assigned to Packaging Groups I or II on the basis of inhalation toxicity criteria, must be hermetically sealed.</p>
Storage incompatibility	<p>Chloroform</p> <ul style="list-style-type: none"> decomposes in the presence of excess water, high temperature, including hot surfaces, evolving phosgene and hydrogen chloride on contact with warm water may form hydrogen chloride decomposes at ordinary temperatures in sunlight, in the absence of air, and in the dark in the presence of air may form explosive materials when mixed with strong bases, alkali metals, lithium, sodium, potassium, sodium-potassium alloys; these may be heat-, friction-, and/or impact sensitive reacts violently with light metals, aluminium, magnesium or titanium powder, disilane, potassium tert-butoxide, methylates (methoxides), potassium acetylene-1,2-dioxide, sodium amide, uranium(III) hydride reacts violently with (acetone + a base), (perchloric acid + phosphorous pentoxide), (KOH + methanol) and (NaOH + methanol). is incompatible with acetone, beryllium, decaborane, methanol, nitrogen tetroxide, strong oxidisers, fluorine, oxygen, potassium, sodium, strong mineral acids, triisopropylphosphine, chemically active metals (Li, NaK alloy), zinc attacks many plastics and rubber attacks iron and other metals in the presence of moisture and elevated temperatures may generate electrostatic charges due to low conductivity <p>Haloalkanes:</p> <ul style="list-style-type: none"> are highly reactive:some of the more lightly substituted lower members are highly flammable; the more highly substituted may be used as fire suppressants, not always with the anticipated results. may react with the lighter divalent metals to produce more reactive compounds analogous to Grignard reagents. may produce explosive compounds following prolonged contact with metallic or other azides may react on contact with potassium or its alloys - although apparently stable on contact with a wide range of halocarbons, reaction products may be shock-sensitive and may explode with great violence on light impact; severity generally increases with the degree of halocarbon substitution and potassium-sodium alloys give extremely sensitive mixtures . <p>BREThERICK L.: Handbook of Reactive Chemical Hazards</p> <ul style="list-style-type: none"> react with metal halides and active metals, eg. sodium (Na), potassium (K), lithium (Li),calcium (Ca), zinc (Zn), powdered aluminium (Al) and aluminium alloys, magnesium (Mg) and magnesium alloys. may react with brass and steel. may react explosively with strong oxidisers may degrade rubber, and plastics such as methacrylate polymers, polyethylene and polystyrene, paint and coatings Avoid strong bases.

PACKAGE MATERIAL INCOMPATIBILITIES

Not Available

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA

Source	Ingredient	Material name	TWA	STEL	Peak	Notes
US NIOSH Recommended Exposure Limits (RELs)	chloroform	Methane trichloride, Trichloromethane	Not Available	9.78 mg/m3 / 2 ppm	Not Available	Ca See Appendix A
US ACGIH Threshold Limit Values (TLV)	chloroform	Chloroform	10 ppm	Not Available	Not Available	TLV® Basis: Liver & embryo/fetal dam; CNS impair
US OSHA Permissible Exposure Levels (PELs) - Table Z1	chloroform	Chloroform (Trichloromethane)	Not Available	Not Available	240 mg/m3 / 50 ppm	Not Available
US NIOSH Recommended Exposure Limits (RELs)	sulfuric acid	Battery acid, Hydrogen sulfate, Oil of vitriol, Sulfuric acid (aqueous)	1 mg/m3	Not Available	Not Available	Not Available
US ACGIH Threshold Limit Values (TLV)	sulfuric acid	Sulfuric acid	0.2 mg/m3	Not Available	Not Available	TLV® Basis: Pulm func
US OSHA Permissible Exposure Levels (PELs) - Table Z1	sulfuric acid	Sulfuric acid	1 mg/m3	Not Available	Not Available	Not Available

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
chloroform	Chloroform	2 ppm	Not Available	Not Available
sulfuric acid	Sulfuric acid	Not Available	Not Available	Not Available


Ingredient	Original IDLH	Revised IDLH
chloroform	500 ppm	Not Available
water	Not Available	Not Available

Continued...

Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

sodium phosphate, monobasic, dihydrate	Not Available	Not Available
sulfuric acid	15 mg/m3	Not Available
methylene blue	Not Available	Not Available
Proprietary ingredient	Not Available	Not Available

Exposure controls

Appropriate engineering controls	Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are: Process controls which involve changing the way a job activity or process is done to reduce the risk. Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use. Employers may need to use multiple types of controls to prevent employee overexposure.	
	Local exhaust ventilation usually required. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure adequate protection. An approved self contained breathing apparatus (SCBA) may be required in some situations. Provide adequate ventilation in warehouse or closed storage area. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.	
	Type of Contaminant:	Air Speed:
	solvent, vapours, degreasing etc., evaporating from tank (in still air).	0.25-0.5 m/s (50-100 f/min.)
	aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5-1 m/s (100-200 f/min.)
	direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min.)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5-10 m/s (500-2000 f/min.)	
Within each range the appropriate value depends on:		
Lower end of the range		Upper end of the range
1: Room air currents minimal or favourable to capture		1: Disturbing room air currents
2: Contaminants of low toxicity or of nuisance value only.		2: Contaminants of high toxicity
3: Intermittent, low production.		3: High production, heavy use
4: Large hood or large air mass in motion		4: Small hood-local control only
Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.		
Personal protection		
Eye and face protection	<ul style="list-style-type: none">▶ Safety glasses with side shields.▶ Chemical goggles.▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59], [AS/NZS 1336 or national equivalent]	
Skin protection	See Hand protection below	
Hands/feet protection	<ul style="list-style-type: none">▶ Wear chemical protective gloves, e.g. PVC.▶ Wear safety footwear or safety gumboots, e.g. Rubber	
Body protection	See Other protection below	
Other protection	<ul style="list-style-type: none">▶ Overalls.▶ Eyewash unit.▶ Barrier cream.▶ Skin cleansing cream.	
Thermal hazards	Not Available	

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:

"Forsberg Clothing Performance Index".

The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:

Respiratory protection

Type AB-P Filter of sufficient capacity (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required.

Degree of protection varies with both face-piece and Class of filter; the nature of protection

Continued...

Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

Material	CPI
BUTYL	C
NATURAL RUBBER	C
NATURAL+NEOPRENE	C
NEOPRENE	C
NEOPRENE/NATURAL	C
NITRILE	C
PE	C
PE/EVAL/PE	C
PVA	C
PVC	C
SARANEX-23	C
TEFLON	C
VITON	C

* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	AB-AUS P2	-	AB-PAPR-AUS / Class 1 P2
up to 50 x ES	-	AB-AUS / Class 1 P2	-
up to 100 x ES	-	AB-2 P2	AB-PAPR-2 P2 ^

^ - Full-face

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	Two phase: Blue / Colorless		
Physical state	Liquid	Relative density (Water = 1)	1.49 (chloroform layer)
Odour	Characteristic	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	Not Available
pH (as supplied)	1.35 (aqueous layer)	Decomposition temperature	Not Available
Melting point / freezing point (°C)	Not Available	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	Not Available	Molecular weight (g/mol)	Not Available
Flash point (°C)	Not Applicable	Taste	Not Available
Evaporation rate	Not Available	Explosive properties	Not Available
Flammability	Not Applicable	Oxidising properties	Not Available
Upper Explosive Limit (%)	Not Available	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	Not Available	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water (g/L)	Partly miscible	pH as a solution	Not Available
Vapour density (Air = 1)	Not Available	VOC g/L	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> Unstable in the presence of incompatible materials. Product is considered stable. Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Continued...

Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

Inhaled	<p>Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may produce toxic effects. The material is not thought to produce respiratory irritation (as classified by EC Directives using animal models). Nevertheless inhalation of vapours, fumes or aerosols, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress.</p> <p>Exposure to vapours of some rare earth salts can cause sensitivity to heat, itching, and increased sensitivity of smell and taste. Other effects include inflamed airways and lung, emphysema, regional narrowing of terminal airways and cell changes.</p> <p>Chloroform concentrations of 1000-2000 parts per million (ppm) may cause dizziness, headache, fatigue, salivation and nausea. 4000 ppm may cause vomiting, serious disorientation and a fainting feeling. 14000-16000 ppm may cause rapid loss of consciousness. More than 20000 ppm may cause breathing failure, heart rhythm disturbances and death. If death does not immediately occur from stoppage of breathing or heart beat, it may occur later from liver and kidney damage.</p> <p>Corrosive acids can cause irritation of the respiratory tract, with coughing, choking and mucous membrane damage. There may be dizziness, headache, nausea and weakness.</p> <p>Acute intoxication by halogenated aliphatic hydrocarbons appears to take place over two stages. Signs of a reversible narcosis are evident in the first stage and in the second stage signs of injury to organs may become evident, a single organ alone is (almost) never involved.</p> <p>Depression of the central nervous system is the most outstanding effect of most halogenated aliphatic hydrocarbons. Inebriation and excitation, passing into narcosis, is a typical reaction. In severe acute exposures there is always a danger of death from respiratory failure or cardiac arrest due to a tendency to make the heart more susceptible to catecholamines (adrenalin)</p>
Ingestion	<p>The material is not thought to produce adverse health effects following ingestion (as classified by EC Directives using animal models). Nevertheless, adverse systemic effects have been produced following exposure of animals by at least one other route and good hygiene practice requires that exposure be kept to a minimum.</p> <p>Symptoms of chloroform ingestion include burning of the mouth, throat, gullet and stomach; diarrhoea and abdominal/lower chest pain; cold, clammy skin, blueness of the extremities and face, muscle cramps, dilated pupils, low blood pressure, blood vessel dilatation on the periphery, irregular breathing, respiratory failure, unconsciousness and liver damage.</p> <p>Ingestion of acidic corrosives may produce burns around and in the mouth, the throat and oesophagus. Immediate pain and difficulties in swallowing and speaking may also be evident.</p>
Skin Contact	<p>The material may accentuate any pre-existing dermatitis condition</p> <p>Skin contact with acidic corrosives may result in pain and burns; these may be deep with distinct edges and may heal slowly with the formation of scar tissue.</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p> <p>The material may cause mild but significant inflammation of the skin either following direct contact or after a delay of some time. Repeated exposure can cause contact dermatitis which is characterised by redness, swelling and blistering.</p>
Eye	<p>If applied to the eyes, this material causes severe eye damage.</p> <p>Direct eye contact with acid corrosives may produce pain, tears, sensitivity to light and burns. Mild burns of the epithelia generally recover rapidly and completely.</p>
Chronic	<p>Repeated or long-term occupational exposure is likely to produce cumulative health effects involving organs or biochemical systems.</p> <p>There has been concern that this material can cause cancer or mutations, but there is not enough data to make an assessment.</p> <p>Ample evidence from experiments exists that there is a suspicion this material directly reduces fertility.</p> <p>Repeated or prolonged exposure to acids may result in the erosion of teeth, swelling and/or ulceration of mouth lining. Irritation of airways to lung, with cough, and inflammation of lung tissue often occurs.</p> <p>Long term exposure to chloroform may produce dizziness, fatigue, drowsiness, memory impairment, increased dreams, loss of appetite, palpitations, liver and kidney damage. There may be depression, confusion, negative changes in behaviour and passive mood states. Chronic abuse of chloroform may cause psychotic behaviour. Repeated exposure may also cause dullness, urinary frequency, gastrointestinal disturbances, dry mouth, thirst, headache, general unwellness, blurred vision, pins and needles, loss of sense of balance, tremors, memory and anaemia. It may be dangerous to the foetus (unborn baby). It has been shown to induce liver, kidney, intestinal and urinary bladder tumours, including cancer.</p>

Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	TOXICITY	IRRITATION
Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	TOXICITY	IRRITATION

CHLOROFORM	<p>The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.</p> <p>WARNING: This substance has been classified by the IARC as Group 2B: Possibly Carcinogenic to Humans.</p> <p>Tenth Annual Report on Carcinogens: Substance anticipated to be Carcinogen</p> <p>[National Toxicology Program: U.S. Dep. of Health & Human Services 2002]</p>
WATER	No significant acute toxicological data identified in literature search.
SODIUM PHOSPHATE, MONOBASIC, DIHYDRATE	Data for anhydride
SULFURIC ACID	<p>Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. On the other hand, industrial bronchitis is a disorder that occurs as a result of exposure due to high concentrations of irritating substance (often particles) and is completely reversible after exposure ceases. The disorder is characterized by difficulty breathing, cough and mucus production.</p>

Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

	<p>WARNING: For inhalation exposure <u>ONLY</u>: This substance has been classified by the IARC as Group 1: CARCINOGENIC TO HUMANS</p> <p>Occupational exposures to strong inorganic acid mists of sulfuric acid:</p>
METHYLENE BLUE	<p>The substance is classified by IARC as Group 3: NOT classifiable as to its carcinogenicity to humans. Evidence of carcinogenicity may be inadequate or limited in animal testing. After i.v. administration Methylene Blue may cause nausea, vomiting, abdominal and chest pain, headache, dizziness, mental confusion, profuse sweating, and hypertension; with very high doses methaemoglobinemia and a hemolysis may occur. Methylene Blue activates a normally dormant reductase enzyme system which reduces the methylene blue to leucomethylene blue, which in turn is able to reduce methaemoglobin to haemoglobin. Methylene Blue is absorbed from the gastrointestinal tract. It is believed to be reduced in the tissues to the leuco form which is slowly excreted, mainly in the urine together with some unchanged drug. Methylene Blue imparts a blue color to urine and faeces. In large doses Methylene Blue can produce methaemoglobinemia. Although intra-amniotic injection of Methylene Blue has been used to diagnose premature rupture of fetal membranes or to identify separate amniotic sacs in twin pregnancies, there have been several reports of hemolytic anemia (Heinz-body anemia) and hyperbilirubinemia in neonates exposed to Methylene Blue in the amniotic cavity. In most cases, exchange transfusions and/or phototherapy are required to control the jaundice. Methylene Blue should be used with caution in the treatment of toxic methemoglobinemia; high doses can cause hemolytic anemias and patients with glucose-6-phosphate dehydrogenase (G6PD) deficiencies are particularly susceptible. A rapid disappearance of cyanosis in response to Methylene Blue would be expected within one hour but might not occur if the patient has erythrocyte G6PD or NADPH-diaphorase deficiency or if methemoglobinemia is due to the ingestion of compounds such as aniline or dapsone. A second dose has been recommended if cyanosis does not disappear within 1 hour of Methylene Blue administration but results of a study in animals and of a patient with aniline poisoning indicated that an increased dosage of Methylene Blue might be of no additional benefit and could be potentially dangerous in that it could enhance Heinz body formation. Methylene Blue should not be injected s.c. as it may cause necrotic abscesses. It should not be given by intrathecal injection as neural damage has occurred. Methylene Blue should be used with caution in patients with glucose-6-phosphate dehydrogenase deficiency.</p>

Acute Toxicity	✓	Carcinogenicity	✓
Skin Irritation/Corrosion	✓	Reproductivity	✓
Serious Eye Damage/Irritation	✓	STOT - Single Exposure	⊘
Respiratory or Skin sensitisation	⊘	STOT - Repeated Exposure	✓
Mutagenicity	⊘	Aspiration Hazard	⊘

Legend:
 ✓ – Data available to make classification
 ✗ – Data available but does not fill the criteria for classification
 ⊘ – Data Not Available to make classification

CMR STATUS

Not Applicable

REPROTOXIN	Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	Not Available	Not Available
CARCINOGEN	Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	Not Available	Not Available
MUTAGEN	Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	Not Available	Not Available
EYE	Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	Not Available	Not Available
RESPIRATORY	Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	Not Available	Not Available
SKIN	Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	Not Available	Not Available

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

NOT AVAILABLE

Ingredient	Endpoint	Test Duration (hr)	Effect	Value	Species	BCF
Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
chloroform	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
water	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
sodium phosphate, monobasic, dihydrate	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
sulfuric acid	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available
methylene blue	Not Available	Not Available	Not Available	Not Available	Not Available	Not Available

For Haloalkanes:

Atmospheric Fate: Fully, or partially, fluorinated haloalkanes released to the air can restrict heat loss from the Earth's atmosphere by absorbing infrared emissions from the surface. The major fate of haloalkanes in the atmosphere is via breakdown by hydroxyl radicals. These substances react with atmospheric ozone and nitrates, which also causes them to change, (transform).

Chlorofluorocarbons, (CFC), haloalkanes can break down into chlorine atoms in the air, which also contribute to ozone destruction.

Terrestrial Fate: Biological breakdown of these substances is expected to be faster than non-biological breakdown, provided that there are sufficient substrates, nutrients and microbial populations. However, because haloalkane-degrading microorganisms are not easily found, biological breakdown of these substances is rare. Several methane-utilizing bacteria have been identified that may use haloalkanes. Biological breakdown may occur through various pathways.

Aquatic Fate: Haloalkanes do not easily break down in water. Biological breakdown of these substances is expected to be faster than non-biological breakdown, provided that there are sufficient substrates, nutrients and microbial populations. In general, alpha- and alpha, omega-chlorinated haloalkanes are de-halogenated by water. Alpha- and alpha, omega-haloalkanes with longer chains, may be de-halogenated by the addition of oxygen, (oxidized). Haloalkanes may break down in water, if certain sulfur ions are present, such as bisulfide ions.

Continued...

Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

Ecotoxicity: Haloparaffins C12 to C18 may be incorporated into fatty acids in bacteria, yeasts, and fungi, resulting in their build up in the food chain. Haloalkanes are persistent and toxic to fish and wildlife.

Ecotoxicity:

The tolerance of water organisms towards pH margin and variation is diverse. Recommended pH values for test species listed in OECD guidelines are between 6.0 and almost 9. Acute testing with fish showed 96h-LC50 at about pH 3.5

For Chloroform:

log Kow: 1.97; Koc: 34; Half-life (hr) air: 1920; Half-life (hr) H2O surface water: 28 744; Henry's atm m3/mol: 4.35E-03; BOD 5: 0.02; ThOD: 0.33,1.346; BCF: 1.9-10.35. Drinking Water Standard - Hydrocarbon total: 10 ug/l (UK max.); Chloroform: 200 ug/l (WHO guideline); Soil Guidelines - Dutch criteria: 0.001 mg/kg.

Atmospheric Fate: Chloroform will generally evaporate to atmosphere; however, transportation may occur over long distances and photo-oxidization will occur (half-life 80 days). Chloroform is expected to exist almost entirely in the vapor phase in the atmosphere. Large amounts of chloroform in the atmosphere may be removed during precipitation; however, most chloroform removed in precipitation is likely to re-enter the atmosphere by volatilization. Long-range atmospheric transport of chloroform is possible. The major degradation process in the air involves reactions with free radicals such as hydroxyl groups. Breakdown products include phosgene and hydrogen chloride. Chloroform is more reactive in photochemical smog conditions where the approximate half-life is 11 days.

Aquatic Fate: Direct photolysis of chloroform will not be a significant degradation process in surface waters and the dominant fate process for chloroform in surface waters is volatilization.

Chloroform present in surface water is expected to volatilize rapidly to the atmosphere. A half-life of 44 hours for volatilization has been estimated.

Terrestrial Fate: Spills and releases on land will evaporate quickly or leach into groundwater where they persist for long periods. Chloroform is not expected to adsorb significantly to sediment or suspended organic matter in surface waters. In soil, the dominant transport mechanism for chloroform near the surface will probably be volatilization with relatively constant rates over a wide variety of soil types.

Ecotoxicity: Chloroform is not expected to concentrate in the food chain. Chloroform does not appear to bioconcentrate in higher aquatic organisms including bluegill sunfish but, has a moderate tendency to concentrate in nonvascular aquatic plants such as green algae. Significant degradation of chloroform under aerobic conditions has been reported in tests. Under the proper conditions, chloroform appears to be much more susceptible to anaerobic biodegradation. Above certain dosage levels, chloroform becomes toxic to anaerobic and aerobic microorganisms. This is especially noticeable for biological treatment facilities that use anaerobic digestion systems, where sustained inputs with chloroform concentrations approaching 100 mg/L can all but eliminate methane fermenting bacteria.

For Cerium:

Environmental Fate: Despite their name, rare earth elements are relatively plentiful in the Earth's crust, with cerium being the 25th most abundant element. Cerium compounds include cerium oxide, cerium carbonate, and cerium chloride.

Atmospheric Fate: Cerium oxidizes very readily at room temperature, especially in moist air. Except for europium, cerium is the most reactive of the rare-earth metals.

Terrestrial Fate: Soil ♦ Cerium is found in minerals including allanite, monazite, cerite, and bastnaesite. Plants ♦ Crops can take up cerium.

Aquatic Fate: Cerium oxide and cerium carbonate are insoluble in water, while cerium chloride is soluble in water. Cerium has affinity for humic substances, which may alter its availability in aquatic systems. The substance slowly decomposes in cold water, and rapidly decomposes in hot water. Alkali solutions and dilute/concentrated acids attack the metal rapidly.

Ecotoxicity: Current fate and transport studies are limited and may not adequately address long term environmental exposure risks to both humans and other living organisms. Although cerium has low acute toxicity, long term health and environmental effects are less well understood. The form cerium takes can also influence its biological and environmental fate. Oxides and hydroxides of cerium are poorly soluble in body fluids thus are slow to clear from the organism. Cerium can affect the respiratory tract and associated lymph nodes, (inhalation exposure), and, once in the circulatory system, can partition to the skeleton, liver, kidney and spleen. Studies subjecting animals to large dosages of cerium show evidence of neurological effects, possibly due to cerium competing with calcium binding sites in the brain. Long term human exposure to cerium is correlated with rare earth pneumoconiosis, but, the precise role of cerium in this disease is not well characterized.

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
chloroform	HIGH (Half-life = 1800 days)	HIGH (Half-life = 259.63 days)
water	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
chloroform	LOW (BCF = 13)
water	LOW (LogKOW = -1.38)

Mobility in soil

Ingredient	Mobility
chloroform	LOW (KOC = 35.04)
water	LOW (KOC = 14.3)


SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	▶
	▶
	▶ Dispose of according to federal, state, and local regulations.
	▶

SECTION 14 TRANSPORT INFORMATION

Labels Required

	
Marine Pollutant	NO

Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

Land transport (DOT)

UN number	3316
Packing group	II
UN proper shipping name	Chemical kits; First aid kits
Environmental hazard	No relevant data
Transport hazard class(es)	Class : 9
Special precautions for user	Hazard Label : 9
	Special provisions : 15

Air transport (ICAO-IATA / DGR)

UN number	3316
Packing group	II
UN proper shipping name	Chemical kit; First aid kit
Environmental hazard	No relevant data
Transport hazard class(es)	ICAO/IATA Class : 9
	ICAO / IATA Subrisk : Not Applicable
	ERG Code : 9L
Special precautions for user	Special provisions : A44 A163
	Cargo Only Packing Instructions : 960
	Cargo Only Maximum Qty / Pack : 10 kg
	Passenger and Cargo Packing Instructions : 960
	Passenger and Cargo Maximum Qty / Pack : 10 kg
	Passenger and Cargo Limited Quantity Packing Instructions : Y960
	Passenger and Cargo Limited Maximum Qty / Pack : 1 kg

Sea transport (IMDG-Code / GGVSee)

UN number	3316
Packing group	II
UN proper shipping name	CHEMICAL KIT or FIRST AID KIT
Environmental hazard	Not Applicable
Transport hazard class(es)	IMDG Class : 9
	IMDG Subrisk : Not Applicable
Special precautions for user	EMS Number : F-A , S-P
	Special provisions : 251 340
	Limited Quantities : See SP251

Transport in bulk according to Annex II of MARPOL and the IBC code

Source	Ingredient	Pollution Category
	Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test	

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

chloroform(67-66-3) is found on the following regulatory lists	"International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs","US - Alaska Limits for Air Contaminants","US - California - Proposition 65 - Priority List for the Development of MADLs for Chemicals Causing Reproductive Toxicity","US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)","US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)","US - California Permissible Exposure Limits for Chemical Contaminants","US - California Proposition 65 - Carcinogens","US - California Proposition 65 - No Significant Risk Levels (NSRLs) for Carcinogens","US - California Proposition 65 - Reproductive Toxicity","US - Hawaii Air Contaminant Limits","US - Idaho - Limits for Air Contaminants","US - Massachusetts - Right To Know Listed Chemicals","US - Michigan Exposure Limits for Air Contaminants","US - Minnesota Permissible Exposure Limits (PELs)","US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens","US - Oregon Permissible Exposure Limits (Z-1)","US - Pennsylvania - Hazardous Substance List","US - Rhode Island Hazardous Substance List","US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants","US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants","US - Washington Permissible exposure limits of air contaminants","US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values","US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants","US ACGIH Threshold Limit Values (TLV)","US ACGIH Threshold Limit Values (TLV) - Carcinogens","US ATSDR Minimal Risk Levels for Hazardous Substances (MRLs)","US Clean Air Act - Hazardous Air Pollutants","US CWA (Clean Water Act) - List of Hazardous Substances","US CWA (Clean Water Act) - Priority Pollutants","US CWA (Clean Water Act) - Toxic Pollutants","US EPA Carcinogens Listing","US EPCRA Section 313 Chemical List","US List of Active Substances Exempt from the TSCA Inventory Notifications (Active-Inactive) Rule","US National Toxicology Program (NTP) 14th Report Part B. Reasonably Anticipated to be a Human Carcinogen","US NIOSH Recommended Exposure Limits (RELs)","US Office of Environmental Health Hazard Assessment Proposition 65 No Significant Risk Levels (NSRLs) for Carcinogens and Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity","US
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Double-Tipped Ampoules for Detergents CHEMets Kit and Refill and for Detergents Instrumental Test

	OSHA Permissible Exposure Levels (PELs) - Table Z1", "US SARA Section 302 Extremely Hazardous Substances", "US Spacecraft Maximum Allowable Concentrations (SMACs) for Airborne Contaminants", "US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory", "US TSCA Chemical Substance Inventory - Interim List of Active Substances", "US TSCA New Chemical Exposure Limits (NCEL)"
water(7732-18-5) is found on the following regulatory lists	"US List of Active Substances Exempt from the TSCA Inventory Notifications (Active-Inactive) Rule", "US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory", "US TSCA Chemical Substance Inventory - Interim List of Active Substances"
sodium phosphate, monobasic, dihydrate(13472-35-0) is found on the following regulatory lists	"US List of Active Substances Exempt from the TSCA Inventory Notifications (Active-Inactive) Rule", "US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory", "US TSCA Chemical Substance Inventory - Interim List of Active Substances"
sulfuric acid(7664-93-9) is found on the following regulatory lists	"International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs", "International Air Transport Association (IATA) Dangerous Goods Regulations - Prohibited List Passenger and Cargo Aircraft", "US - Alaska Limits for Air Contaminants", "US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs (RELs)", "US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs)", "US - California Permissible Exposure Limits for Chemical Contaminants", "US - Hawaii Air Contaminant Limits", "US - Idaho - Limits for Air Contaminants", "US - Massachusetts - Right To Know Listed Chemicals", "US - Michigan Exposure Limits for Air Contaminants", "US - Minnesota Permissible Exposure Limits (PELs)", "US - New Jersey Right to Know - Special Health Hazard Substance List (SHHSL): Carcinogens", "US - Oregon Permissible Exposure Limits (Z-1)", "US - Pennsylvania - Hazardous Substance List", "US - Rhode Island Hazardous Substance List", "US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants", "US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants", "US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants", "US - Washington Permissible exposure limits of air contaminants", "US - Washington Toxic air pollutants and their ASIL, SQER and de minimis emission values", "US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants", "US ACGIH Threshold Limit Values (TLV)", "US ACGIH Threshold Limit Values (TLV) - Carcinogens", "US CWA (Clean Water Act) - List of Hazardous Substances", "US Drug Enforcement Administration (DEA) List I and II Regulated Chemicals", "US EPCRA Section 313 Chemical List", "US List of Active Substances Exempt from the TSCA Inventory Notifications (Active-Inactive) Rule", "US National Toxicology Program (NTP) 14th Report Part A Known to be Human Carcinogens", "US NIOSH Recommended Exposure Limits (RELs)", "US OSHA Permissible Exposure Levels (PELs) - Table Z1", "US SARA Section 302 Extremely Hazardous Substances", "US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory", "US TSCA Chemical Substance Inventory - Interim List of Active Substances"
methylene blue(61-73-4) is found on the following regulatory lists	"International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs", "US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"
Proprietary ingredient() is found on the following regulatory lists	"Not Applicable"

SECTION 16 OTHER INFORMATION

Other information

Ingredients with multiple cas numbers

Name	CAS No
Not Available	Not Available

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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Simplicity in Water Analysis

Cover Page for Safety Data Sheet

Thank you for choosing CHEMetrics, Inc. We appreciate your business. In order to best serve your needs for accurate and complete Safety Data, we offer the following information as supplemental to the attached SDS.

SDS No.: R1001

Version No.: 2.2

Product Name: CHEMetrics® Ampoules for Filming Amines CHEMetrics® Kit & Refill (R-1001) and for Detergents CHEMetrics® Kit & Refill (R-9401)

Component of water analysis reagent sets: Refills R-1000, R-1000E, R-9400, R-9404 and Test Kits K-1001, K-1001E, K-9400, K-9404

Product Descriptions:

CHEMetrics Ampoules: Sealed glass ampoules, 7 mm OD, for visual colorimetric water analysis. Each CHEMet™ ampoule contains approximately 0.25 mL of liquid reagent sealed under vacuum. The refills and kits contain 20 CHEMetrics ampoules.

Addendum to Section 14 Transport Information:

Shipping container markings and labels for this product, as received, may vary from the contents of section 14 of the SDS for one or both of the following reasons:

- CHEMetrics has packaged this product as Dangerous Goods in Excepted Quantities according to IATA, US DOT, and IMDG regulations.
- CHEMetrics has packaged this product as part of a test kit or reagent set composed of various chemical reagents and elected to ship as UN 3316 Chemical Kit, Hazard Class 9, Packing Group II or III.

In case of reshipment, it is the responsibility of the shipper to determine appropriate labels and markings in accordance with applicable transportation regulations.

Additional Information:

- "Print Date" = Revision Date (expressed as DD/MM/YYYY)
- Test kits and reagents sets may contain additional chemical reagents. See separate SDS(s).

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CHEMetrics Ampoules for Filming Amines CHEMetrics Kit & Refill (R-1001) and for Detergents CHEMetrics Kit & Refill (R-9401)

CHEMetrics, Inc.

Chemwatch: 9-92655

SDS No: R1001

Version No: 2.2

Safety Data Sheet according to OSHA HazCom Standard (2012) requirements

Chemwatch Hazard Alert Code: 3

Issue Date: 03/11/2014

Print Date: 12/03/2015

Initial Date: 05/11/2014

S.GHS.USA.EN

SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

Product Identifier

Product name	CHEMetrics Ampoules for Filming Amines CHEMetrics Kit & Refill (R-1001) and for Detergents CHEMetrics Kit & Refill (R-9401)
Synonyms	Not Available
Proper shipping name	Chemical kits First aid kits
Chemical formula	Not Applicable
Other means of identification	Not Available
CAS number	Not Applicable

Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Component of water analysis reagent sets: refills R-1000, R-1000E, R-9400, R-9404 and test kits K-1001, K-1001E, K-9400, K-9404
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Details of the manufacturer/importer

Registered company name	CHEMetrics, Inc.
Address	4295 Catlett Road, Midland, VA. 22728 United States
Telephone	1-540-788-9026
Fax	1-540-788-4856
Website	www.chemetrics.com
Email	technical@chemetrics.com

Emergency telephone number




Association / Organisation	ChemTel Inc.
Emergency telephone numbers	1-800-255-3924
Other emergency telephone numbers	+01-813-248-0585

SECTION 2 HAZARDS IDENTIFICATION

Classification of the substance or mixture

GHS Classification	Flammable Liquid Category 3, Serious Eye Damage Category 1, STOT - SE (Narcosis) Category 3
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Label elements

GHS label elements	  
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SIGNAL WORD	DANGER
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Hazard statement(s)

H226	Flammable liquid and vapour
H318	Causes serious eye damage
H336	May cause drowsiness or dizziness

Precautionary statement(s) Prevention

Continued...

CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)

P101	If medical advice is needed, have product container or label at hand.
P102	Keep out of reach of children.
P103	Read label before use.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P261	Avoid breathing dust/fume/gas/mist/vapours/spray.
P240	Ground/bond container and receiving equipment.

Precautionary statement(s) Response

P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER/doctor/physician/first aider
P370+P378	In case of fire: Use alcohol resistant foam or fine spray/water fog for extinction.
P303+P361+P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.

Precautionary statement(s) Storage

P403+P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P403+P233	Store in a well-ventilated place. Keep container tightly closed.

Precautionary statement(s) Disposal

P501	Dispose of contents/container to authorised chemical landfill or if organic to high temperature incineration
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SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS

Substances

See section below for composition of Mixtures

Mixtures

CAS No	%[weight]	Name
71-23-8	98	n-propanol
7732-18-5	2	water

SECTION 4 FIRST AID MEASURES

Description of first aid measures

Eye Contact	<p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> ▶ Immediately hold eyelids apart and flush the eye continuously with running water. ▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids. ▶ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes. ▶ Transport to hospital or doctor without delay. ▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.
Skin Contact	<p>If skin or hair contact occurs:</p> <ul style="list-style-type: none"> ▶ Flush skin and hair with running water (and soap if available). ▶ Seek medical attention in event of irritation.
Inhalation	<ul style="list-style-type: none"> ▶ If fumes, aerosols or combustion products are inhaled remove from contaminated area. ▶ Other measures are usually unnecessary.
Ingestion	<ul style="list-style-type: none"> ▶ Immediately give a glass of water. ▶ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor. ▶ If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomitus.

Indication of any immediate medical attention and special treatment needed

To treat poisoning by the higher aliphatic alcohols (up to C7):

- ▶ Gastric lavage with copious amounts of water.
- ▶ It may be beneficial to instill 60 ml of mineral oil into the stomach.
- ▶ Oxygen and artificial respiration as needed.
- ▶ Electrolyte balance: it may be useful to start 500 ml. M/6 sodium bicarbonate intravenously but maintain a cautious and conservative attitude toward electrolyte replacement unless shock or severe acidosis threatens.
- ▶ To protect the liver, maintain carbohydrate intake by intravenous infusions of glucose.
- ▶ Haemodialysis if coma is deep and persistent. [GOSSELIN, SMITH HODGE: Clinical Toxicology of Commercial Products, Ed 5]

BASIC TREATMENT

- ▶ Establish a patent airway with suction where necessary.
- ▶ Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- ▶ Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- ▶ Monitor and treat, where necessary, for shock.
- ▶ Monitor and treat, where necessary, for pulmonary oedema.
- ▶ Anticipate and treat, where necessary, for seizures.

Continued...

CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)

- ▶ **DO NOT use emetics.** Where ingestion is suspected rinse mouth and give up to 200 ml water (5 ml/kg recommended) for dilution where patient is able to swallow, has a strong gag reflex and does not drool.
- ▶ Give activated charcoal.

ADVANCED TREATMENT

- ▶ Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- ▶ Positive-pressure ventilation using a bag-valve mask might be of use.
- ▶ Monitor and treat, where necessary, for arrhythmias.
- ▶ Start an IV D5W TKO. If signs of hypovolaemia are present use lactated Ringers solution. Fluid overload might create complications.
- ▶ If the patient is hypoglycaemic (decreased or loss of consciousness, tachycardia, pallor, dilated pupils, diaphoresis and/or dextrose strip or glucometer readings below 50 mg), give 50% dextrose.
- ▶ Hypotension with signs of hypovolaemia requires the cautious administration of fluids. Fluid overload might create complications.
- ▶ Drug therapy should be considered for pulmonary oedema.
- ▶ Treat seizures with diazepam.
- ▶ Proparacaine hydrochloride should be used to assist eye irrigation.

EMERGENCY DEPARTMENT

- ▶ Laboratory analysis of complete blood count, serum electrolytes, BUN, creatinine, glucose, urinalysis, baseline for serum aminotransferases (ALT and AST), calcium, phosphorus and magnesium, may assist in establishing a treatment regime. Other useful analyses include anion and osmolar gaps, arterial blood gases (ABGs), chest radiographs and electrocardiograph.
- ▶ Positive end-expiratory pressure (PEEP)-assisted ventilation may be required for acute parenchymal injury or adult respiratory distress syndrome.
- ▶ Acidosis may respond to hyperventilation and bicarbonate therapy.
- ▶ Haemodialysis might be considered in patients with severe intoxication.
- ▶ Consult a toxicologist as necessary. BRONSTEIN, A.C. and CURRANCE, P.L. EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994

For C8 alcohols and above.

Symptomatic and supportive therapy is advised in managing patients.

SECTION 5 FIREFIGHTING MEASURES

Extinguishing media

- ▶ Alcohol stable foam.
- ▶ Dry chemical powder.
- ▶ BCF (where regulations permit).
- ▶ Carbon dioxide.
- ▶ Water spray or fog - Large fires only.

Special hazards arising from the substrate or mixture

- | | |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Fire Incompatibility | ▶ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result |
|-----------------------------|------------------------------------------------------------------------------------------------------------------------------------------|

Advice for firefighters

Fire Fighting

- ▶ Alert Fire Brigade and tell them location and nature of hazard.
- ▶ Wear full body protective clothing with breathing apparatus.
- ▶ Prevent, by any means available, spillage from entering drains or water course.
- ▶ Use water delivered as a fine spray to control fire and cool adjacent area.
- ▶ Avoid spraying water onto liquid pools.

Fire/Explosion Hazard

- ▶ Combustible.
- ▶ Slight fire hazard when exposed to heat or flame.
- ▶ Heating may cause expansion or decomposition leading to violent rupture of containers.
- ▶ On combustion, may emit toxic fumes of carbon monoxide (CO).
- ▶ May emit acid smoke.

SECTION 6 ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Minor Spills

- ▶ Remove all ignition sources.
- ▶ Clean up all spills immediately.
- ▶ Avoid breathing vapours and contact with skin and eyes.
- ▶ Control personal contact with the substance, by using protective equipment.
- ▶ Contain and absorb small quantities with vermiculite or other absorbent material.

Major Spills

- Moderate hazard.
- ▶ Clear area of personnel and move upwind.
 - ▶ Alert Fire Brigade and tell them location and nature of hazard.
 - ▶ Wear breathing apparatus plus protective gloves.
 - ▶ Prevent, by any means available, spillage from entering drains or water course.

Personal Protective Equipment advice is contained in Section 8 of the MSDS.

SECTION 7 HANDLING AND STORAGE

Precautions for safe handling

Safe handling

- ▶ **DO NOT allow clothing wet with material to stay in contact with skin**
- ▶ Avoid all personal contact, including inhalation.
- ▶ Wear protective clothing when risk of exposure occurs.
- ▶ Use in a well-ventilated area.
- ▶ Prevent concentration in hollows and sumps.
- ▶ **DO NOT enter confined spaces until atmosphere has been checked.**

CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)

	Wear impact- and splash-resistant eyewear. Break the ampoule tip only when it is completely immersed in sample. Breaking the tip in air may cause the glass ampoule to shatter.
Other information	<ul style="list-style-type: none"> ▶ Store in original containers. ▶ Keep containers securely sealed. ▶ Store in a cool, dry, well-ventilated area. ▶ Store away from incompatible materials and foodstuff containers. ▶ Protect containers against physical damage and check regularly for leaks. For optimum analytical performance, store in the dark and at room temperature.

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"> ▶ Metal can or drum ▶ Packaging as recommended by manufacturer. ▶ Check all containers are clearly labelled and free from leaks.
Storage incompatibility	<p>Alcohols</p> <ul style="list-style-type: none"> ▶ are incompatible with strong acids, acid chlorides, acid anhydrides, oxidising and reducing agents. ▶ reacts, possibly violently, with alkaline metals and alkaline earth metals to produce hydrogen ▶ react with strong acids, strong caustics, aliphatic amines, isocyanates, acetaldehyde, benzoyl peroxide, chromic acid, chromium oxide, dialkylzincs, dichlorine oxide, ethylene oxide, hypochlorous acid, isopropyl chlorocarbonate, lithium tetrahydroaluminate, nitrogen dioxide, pentafluoroguanidine, phosphorus halides, phosphorus pentasulfide, tangerine oil, triethylaluminium, triisobutylaluminium ▶ should not be heated above 49 deg. C. when in contact with aluminium equipment

PACKAGE MATERIAL INCOMPATIBILITIES

Not Available

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Control parameters

OCCUPATIONAL EXPOSURE LIMITS (OEL)

INGREDIENT DATA


Source	Ingredient	Material name	TWA	STEL	Peak	Notes
US OSHA Permissible Exposure Levels (PELs) - Table Z1	n-propanol	n-Propyl alcohol	500 mg/m ³ / 200 ppm	Not Available	Not Available	Not Available
US ACGIH Threshold Limit Values (TLV)	n-propanol	n-Propanol (n-Propyl alcohol)	100 ppm	Not Available	Not Available	TLV® Basis: Eye & URT irr
US NIOSH Recommended Exposure Limits (RELs)	n-propanol	Ethyl carbinol, 1-Propanol, n-Propanol, Propyl alcohol	500 mg/m ³ / 200 ppm	625 mg/m ³ / 250 ppm	Not Available	[skin]

EMERGENCY LIMITS

Ingredient	Material name	TEEL-1	TEEL-2	TEEL-3
n-propanol	Propyl alcohol, n-; (n-Propanol)	250 ppm	250 ppm	4000 ppm

Ingredient	Original IDLH	Revised IDLH
n-propanol	4,000 ppm	800 ppm
water	Not Available	Not Available

Exposure controls

Appropriate engineering controls	<p>Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.</p> <p>The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p> <p>Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly.</p>
Personal protection	
Eye and face protection	<ul style="list-style-type: none"> ▶ Safety glasses with side shields. ▶ Chemical goggles. ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience.
Skin protection	See Hand protection below
Hands/feet protection	<p>The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.</p> <p>The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.</p> <p>Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:</p> <ul style="list-style-type: none"> ▶ frequency and duration of contact, ▶ chemical resistance of glove material, ▶ glove thickness and ▶ dexterity

Continued...

CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)

	Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).
Body protection	See Other protection below
Other protection	<ul style="list-style-type: none"> ▶ Overalls. ▶ P.V.C. apron. ▶ Barrier cream. ▶ Skin cleansing cream.
Thermal hazards	Not Available

Recommended material(s)

GLOVE SELECTION INDEX

Glove selection is based on a modified presentation of the:

"Forsberg Clothing Performance Index".

The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:

CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)

Material	CPI
NEOPRENE	A
VITON	B
BUTYL	C
NATURAL RUBBER	C
NATURAL+NEOPRENE	C
NEOPRENE/NATURAL	C
NITRILE	C
NITRILE+PVC	C
PVA	C
PVC	C
TEFLON	C

* CPI - Chemwatch Performance Index

A: Best Selection

B: Satisfactory; may degrade after 4 hours continuous immersion

C: Poor to Dangerous Choice for other than short term immersion

NOTE: As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -

* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Respiratory protection

Type A Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required.

Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

Required Minimum Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator
up to 10 x ES	Air-line*	A-2	A-PAPR-2 ^
up to 20 x ES	-	A-3	-
20+ x ES	-	Air-line**	-

* - Continuous-flow; ** - Continuous-flow or positive pressure demand

^ - Full-face

A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO₂), G = Agricultural chemicals, K = Ammonia(NH₃), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Appearance	colorless, may contain black particles		
Physical state	Liquid	Relative density (Water = 1)	0.8
Odour	Characteristic	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	413
pH (as supplied)	Not Available	Decomposition temperature	Not Available
Melting point / freezing point (°C)	-127	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	97	Molecular weight (g/mol)	Not Available
Flash point (°C)	23	Taste	Not Available
Evaporation rate	Not Available	Explosive properties	Not Available
Flammability	Flammable.	Oxidising properties	Not Available
Upper Explosive Limit (%)	13.5	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	2.1	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water (g/L)	Miscible	pH as a solution	8.5
Vapour density (Air = 1)	Not Available	VOC g/L	Not Available

SECTION 10 STABILITY AND REACTIVITY

Reactivity	See section 7
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Continued...

CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)

Chemical stability	<ul style="list-style-type: none"> ▶ Unstable in the presence of incompatible materials. ▶ Product is considered stable. ▶ Hazardous polymerisation will not occur.
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

SECTION 11 TOXICOLOGICAL INFORMATION

Information on toxicological effects

Inhaled	The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting. Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by sleepiness, reduced alertness, loss of reflexes, lack of co-ordination, and vertigo. Subjects unacclimatised to n-propanol exposure experienced mild irritation of the eyes, nose and throat at a concentration of 400 parts per million.
Ingestion	Overexposure to non-ring alcohols causes nervous system symptoms. These include headache, muscle weakness and inco-ordination, giddiness, confusion, delirium and coma. The material has NOT been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence.
Skin Contact	The material is not thought to produce adverse health effects or skin irritation following contact (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting. The calculated human skin permeability coefficient for n-propanol by the U.S. Environment Protection Agency is 1.3 x 10 ⁻³ cm/hr. Most liquid alcohols appear to act as primary skin irritants in humans. Significant percutaneous absorption occurs in rabbits but not apparently in man.
Eye	If applied to the eyes, this material causes severe eye damage.
Chronic	Long-term exposure to the product is not thought to produce chronic effects adverse to the health (as classified by EC Directives using animal models); nevertheless exposure by all routes should be minimised as a matter of course. N-propanol is shown to cause dose dependent severe liver injury, malignant tumours (blood and liver cancers) and benign tumours in rats. There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment.

CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)	TOXICITY	IRRITATION
CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)	TOXICITY	IRRITATION

CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)	No significant acute toxicological data identified in literature search. The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.
N-PROPANOL	The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis. The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.
WATER	No significant acute toxicological data identified in literature search.

Acute Toxicity	☐	Carcinogenicity	☐
Skin Irritation/Corrosion	☐	Reproductivity	☐
Serious Eye Damage/Irritation	✓	STOT - Single Exposure	✓
Respiratory or Skin sensitisation	☐	STOT - Repeated Exposure	☐
Mutagenicity	☐	Aspiration Hazard	☐

Legend: ✓ – Data required to make classification available
 ✗ – Data available but does not fill the criteria for classification
 ☐ – Data Not Available to make classification

CMR STATUS

SKIN	n-propanol	US - Hawaii Air Contaminant Limits - Skin Designation US NIOSH Recommended Exposure Limits (RELs) - Skin US - Washington Permissible exposure limits of air contaminants - Skin US - California Permissible Exposure Limits for Chemical Contaminants - Skin	X[[skin]]S
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Continued...

CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)

SECTION 12 ECOLOGICAL INFORMATION

Toxicity

For n-Propanol: log Kow: 0.25-0.34;
 Half-life (hr) air: 6.7;
 Half-life (hr) H₂O surface water: 6.5;
 Henry's atm m³/mol: 6.85E-06;
 BOD 5: 1.43-1.6 g O₂/g;
 BOD 20: <2 g O₂/g;
 COD : 91%;
 ThOD : 1.8 g;
 O₂/gBCF: 0.7.

Aquatic Fate: High biochemical oxygen demand and a potential to cause oxygen depletion in aqueous systems, a low potential to affect aquatic organisms, a low potential to affect secondary waste treatment microbial metabolism. n-Propanol is expected to biodegrade and is not expected to persist for long periods in aquatic environments. When diluted with a large amount of water, n-propanol is not expected to have a significant impact.

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
n-propanol	LOW	LOW
water	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
n-propanol	LOW (LogKOW = 0.25)
water	LOW (LogKOW = -1.38)

Mobility in soil

Ingredient	Mobility
n-propanol	HIGH (KOC = 1.325)
water	LOW (KOC = 14.3)


SECTION 13 DISPOSAL CONSIDERATIONS

Waste treatment methods

Product / Packaging disposal	Dispose of according to federal, state, and local regulations.
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SECTION 14 TRANSPORT INFORMATION

Labels Required

	
Marine Pollutant	NO

Land transport (DOT)

UN number	3316
Packing group	II
UN proper shipping name	Chemical kits; First aid kits
Environmental hazard	No relevant data
Transport hazard class(es)	Class : 9
Special precautions for user	Special provisions : 15

Air transport (ICAO-IATA / DGR)

UN number	3316
Packing group	II
UN proper shipping name	Chemical kit †; First aid kit †
Environmental hazard	No relevant data
Transport hazard class(es)	ICAO/IATA Class : 9 ICAO / IATA Subrisk : Not Applicable ERG Code : 9L

CHEMets Ampoules for Filming Amines CHEMets Kit & Refill (R-1001) and for Detergents CHEMets Kit & Refill (R-9401)

Special precautions for user	Special provisions	A44 A163
	Cargo Only Packing Instructions	960
	Cargo Only Maximum Qty / Pack	10 kg
	Passenger and Cargo Packing Instructions	960
	Passenger and Cargo Maximum Qty / Pack	10 kg
	Passenger and Cargo Limited Quantity Packing Instructions	Y960
	Passenger and Cargo Limited Maximum Qty / Pack	1 kg

Sea transport (IMDG-Code / GGVSee)

UN number	3316	
Packing group	II	
UN proper shipping name	CHEMICAL KIT or FIRST AID KIT	
Environmental hazard	Not Applicable	
Transport hazard class(es)	IMDG Class	9
	IMDG Subrisk	Not Applicable
Special precautions for user	EMS Number	F-A , S-P
	Special provisions	251 340
	Limited Quantities	See SP251

Transport in bulk according to Annex II of MARPOL 73 / 78 and the IBC code

Source	Ingredient	Pollution Category
IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk	n-propanol	Y

SECTION 15 REGULATORY INFORMATION

Safety, health and environmental regulations / legislation specific for the substance or mixture

n-propanol(71-23-8) is found on the following regulatory lists	"US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants", "US - Idaho - Limits for Air Contaminants", "US - Hawaii Air Contaminant Limits", "US - California Permissible Exposure Limits for Chemical Contaminants", "US ACGIH Threshold Limit Values (TLV) - Carcinogens", "US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants", "US - Oregon Permissible Exposure Limits (Z-1)", "US - Michigan Exposure Limits for Air Contaminants", "US NIOSH Recommended Exposure Limits (RELs)", "US - Alaska Limits for Air Contaminants", "US - Washington Permissible exposure limits of air contaminants", "US - Minnesota Permissible Exposure Limits (PELs)", "US ACGIH Threshold Limit Values (TLV)", "US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants", "US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory", "US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants", "US OSHA Permissible Exposure Levels (PELs) - Table Z1"
water(7732-18-5) is found on the following regulatory lists	"US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory"

SECTION 16 OTHER INFORMATION

Other information

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

A list of reference resources used to assist the committee may be found at:

www.chemwatch.net/references

The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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Chlorine Test Kit

CN-80 (2129000)

DOC326.98.00032

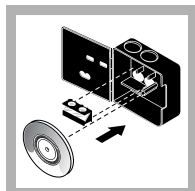
Test preparation

CAUTION: ⚠️ *Review the Safety Data Sheets (MSDS/SDS) for the chemicals that are used. Use the recommended personal protective equipment.*

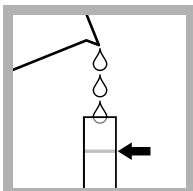
NOTICE: *This product has not been evaluated to test for chlorine and chloramines in medical applications in the United States.*

- Analyze samples immediately after collection.
- Put the color disc on the center pin in the color comparator box (numbers to the front).
- Use the 0–3.4 mg/L color disc for the low and mid-range procedures. Use the 0–10 mg/L color disc for the high-range procedure.
- Use sunlight or a lamp as a light source to find the color match with the color comparator box.
- Rinse the tubes with sample before the test. Rinse the tubes with deionized water after the test.
- To clean stains, use a mild detergent and brush, then fully rinse with deionized water.
- If the color match is between two segments, use the value that is in the middle of the two segments.
- If the color disc becomes wet internally, pull apart the flat plastic sides to open the color disc. Remove the thin inner disc. Dry all parts with a soft cloth. Assemble when fully dry.
- The long-path adapter for the low range test shows the color in the tubes from top to bottom. Make sure the light source is above the tubes during the color match.
- Undissolved reagent does not have an effect on test accuracy.
- For free chlorine, read the result immediately after the reagent is added to prevent interference from monochloramine. Only use the high range test for free chlorine when the sample water is superchlorinated.

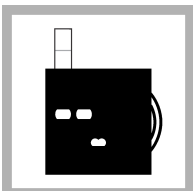
Test procedure—Free or total chlorine, low range (0–0.68 mg/L Cl₂)



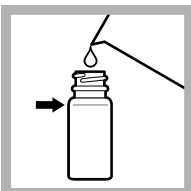
1. Install the long-path adapter in the color comparator box.



2. Fill a tube to the top line with sample.



3. Put the tube into the left opening of the color comparator box.



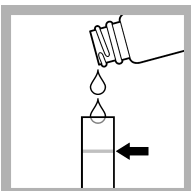
4. Fill the bottle to the 25-mL mark with sample.



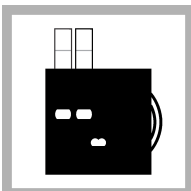
5. Add one DPD (Free or Total) Chlorine Powder Pillow. Swirl to mix.



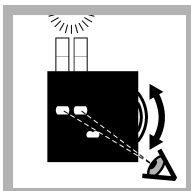
6. For free chlorine, read the result within 1 minute. For total chlorine, wait 3 minutes. Read the result within 6 minutes.



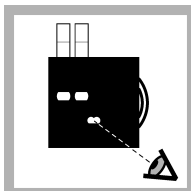
7. Fill a second tube to the top line with the prepared sample.



8. Put the second tube into the color comparator box.



9. Hold the color comparator box below a light source. Turn the color disc to find the color match.



10. Read the value in the scale window. Divide the value by 5 to get the result in mg/L.

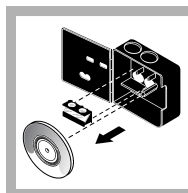
Replacement items

Description	Unit	Item no.
DPD Free Chlorine Reagent Powder Pillows, 25 mL	100/pkg	1407099
DPD Total Chlorine Reagent Powder Pillows, 25 mL	100/pkg	1406499
Bottle, square, with 25-mL mark	each	1704200
Color disc, DPD chlorine, 0–3.4 mg/L	each	990200
Color disc, DPD chlorine, 0–10 mg/L	each	9261600
Color comparator box	each	173200
Long-path adapter	each	2412200
Plastic viewing tubes, 18 mm, with caps	4/pkg	4660004
Tube insert, optical	each	2128800

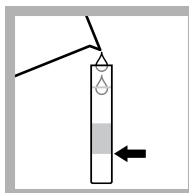
Optional items

Description	Unit	Item no.
Brush, test tube	each	69000
Caps for plastic viewing tubes (4660004)	4/pkg	4660014
Detergent, Liqui-Nox	946 mL	2088153
Glass viewing tubes, 18 mm	6/pkg	173006
Stoppers for 18-mm glass tubes and AccuVac Ampuls	6/pkg	173106
Water, deionized	500 mL	27249

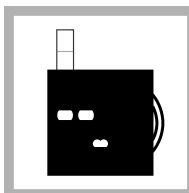
Test procedure—Free or total chlorine, mid range (0–3.4 mg/L Cl₂)



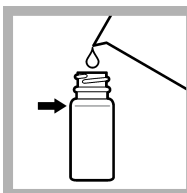
1. If installed, remove the long-path adapter.



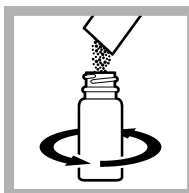
2. Fill a tube to the first line (5 mL) with sample.



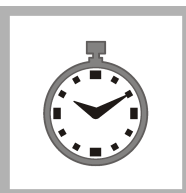
3. Put the tube into the left opening of the color comparator box.



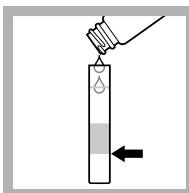
4. Fill the bottle to the 25-mL mark with sample.



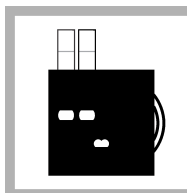
5. Add one DPD (Free or Total) Chlorine Powder Pillow. Swirl to mix.



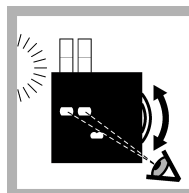
6. For free chlorine, read the result within 1 minute. For total chlorine, wait 3 minutes. Read the result within 6 minutes.



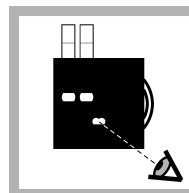
7. Fill a second tube to the first line (5 mL) with the prepared sample.



8. Put the second tube into the color comparator box.

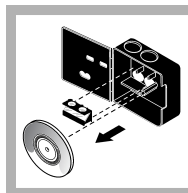


9. Hold the color comparator box in front of a light source. Turn the color disc to find the color match.

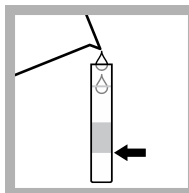


10. Read the result in mg/L in the scale window.

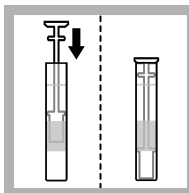
Test procedure—Free or total chlorine, high range (0–10 mg/L Cl₂)



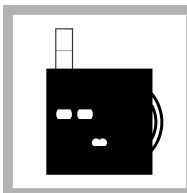
1. If installed, remove the long-path adapter.



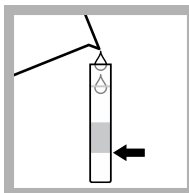
2. Fill a tube to the first line (5 mL) with sample.



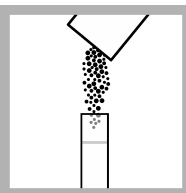
3. Add an optical tube insert.



4. Put the tube into the left opening of the color comparator box.



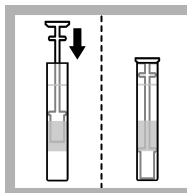
5. Fill a second tube to the first line (5 mL) with sample.



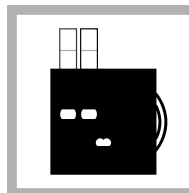
6. Add one DPD (Free or Total) Chlorine Powder Pillow to the second tube.



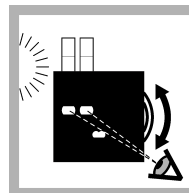
7. For free chlorine, read the result within 1 minute. For total chlorine, wait 3 minutes. Read the result within 6 minutes.



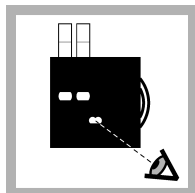
8. Add an optical tube insert to the second tube.



9. Put the second tube into the color comparator box.



10. Hold the color comparator box in front of a light source. Turn the color disc to find the color match.



11. Read the result in mg/L in the scale window.





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SAFETY DATA SHEET

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1. IDENTIFICATION

Product identifier

Product Name DPD Free Chlorine Reagent

Other means of identification

Product Code(s) 1407028

Safety data sheet number M00109

HMRIC # HMIRA Registry Number 9935 Filed 2016-04-11

Recommended use of the chemical and restrictions on use

Recommended Use Laboratory Use. Determination of Free Chlorine.

Uses advised against None.

Restrictions on use None.

Details of the supplier of the safety data sheet

Manufacturer Address

Hach Company P.O.Box 389 Loveland, CO 80539 USA +1(970) 669-3050

Emergency telephone number

+1(303) 623-5716 - 24 Hour Service +1(515)232-2533 - 8am - 4pm CST

2. HAZARDS IDENTIFICATION

Classification

Regulatory Status

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2A

Hazards not otherwise classified (HNOC)

Not applicable

Label elements

Signal word - Warning



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Hazard statements

H315 - Causes skin irritation
H319 - Causes serious eye irritation

Precautionary statements

P302 + P352 - IF ON SKIN: Wash with plenty of soap and water
P332 + P313 - If skin irritation occurs: Get medical advice/attention
P362 - Take off contaminated clothing and wash before reuse
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P337 + P313 - If eye irritation persists: Get medical advice/attention

Other Hazards Known

Not applicable

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance

Not applicable

Mixture

Chemical Family Mixture.

Percent ranges are used where confidential product information is applicable.

Chemical name	CAS No.	Percent Range	HMRIC #
Sodium phosphate dibasic	7558-79-4	30 - 40%	-
DPD Salt	-	1 - 5%	-
Disodium EDTA	139-33-3	1 - 5%	-

4. FIRST AID MEASURES

Description of first aid measures

General advice	Show this safety data sheet to the doctor in attendance.
Inhalation	Remove to fresh air. Get medical attention immediately if symptoms occur.
Eye contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Keep eye wide open while rinsing. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists. Do not rub affected area.
Skin contact	Wash off immediately with soap and plenty of water for at least 15 minutes. Get medical attention if irritation develops and persists.
Ingestion	Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. Do NOT induce vomiting. Call a physician.
Self-protection of the first aider	Avoid contact with skin, eyes or clothing.

Most important symptoms and effects, both acute and delayed

Symptoms	Burning sensation.
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Indication of any immediate medical attention and special treatment needed

Note to physicians	Treat symptomatically.
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5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Unsuitable Extinguishing Media	Caution: Use of water spray when fighting fire may be inefficient.
Specific hazards arising from the chemical	No information available.
Hazardous combustion products	Carbon monoxide, Carbon dioxide. Phosphorus oxides. Nitrogen oxides.
Special protective equipment for fire-fighters	Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear.

6. ACCIDENTAL RELEASE MEASURES

U.S. Notice	Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance. Outside of the US, only persons properly qualified according to state or local regulations should respond to a spill involving chemicals.
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Personal precautions, protective equipment and emergency procedures

Personal precautions	Avoid contact with skin, eyes or clothing. Ensure adequate ventilation. Use personal protective equipment as required.
Other Information	Refer to protective measures listed in Sections 7 and 8.

Environmental precautions

Environmental precautions Prevent further leakage or spillage if safe to do so.

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Pick up and transfer to properly labeled containers.

Prevention of secondary hazards Clean contaminated objects and areas thoroughly observing environmental regulations.

Reference to other sections See section 8 for more information. See section 13 for more information.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. Do not eat, drink or smoke when using this product. Take off contaminated clothing and wash before reuse.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep containers tightly closed in a dry, cool and well-ventilated place.

Flammability class Not applicable

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies

Appropriate engineering controls

Engineering Controls Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

Respiratory protection No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

Hand Protection Wear suitable gloves. Impervious gloves.

Eye/face protection If splashes are likely to occur, wear safety glasses with side-shields.

Skin and body protection Wear suitable protective clothing. Long sleeved clothing.

General Hygiene Considerations Wear suitable gloves and eye/face protection. Do not eat, drink or smoke when using this product. Avoid contact with skin, eyes or clothing.

Environmental exposure controls Local authorities should be advised if significant spillages cannot be contained. Do not allow into any sewer, on the ground or into any body of water.

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Thermal hazards None under normal processing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state	Solid	Color	White to light pink
Appearance	powder	Odor threshold	No data available
Odor	Odorless		

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
Molecular weight	No data available	
pH	6.3	1% Solution
Melting point/freezing point	No data available	
Boiling point / boiling range	No data available	
Evaporation rate	Not applicable	
Vapor pressure	Not applicable	
Vapor density (air = 1)	Not applicable	
Specific gravity (water = 1 / air = 1)	1.76	
Partition Coefficient (n-octanol/water)	log K _{ow} ~ 0	
Soil Organic Carbon-Water Partition Coefficient	log K _{oc} ~ 0	
Autoignition temperature	No data available	
Decomposition temperature	110 °C / 230 °F	
Dynamic viscosity	Not applicable	
Kinematic viscosity	Not applicable	

Solubility(ies)

Water solubility

<u>Water solubility classification</u>	<u>Water solubility</u>	<u>Water Solubility Temperature</u>
Soluble	> 1000 mg/L	25 °C / 77 °F

Solubility in other solvents

<u>Chemical Name</u>	<u>Solubility classification</u>	<u>Solubility</u>	<u>Solubility Temperature</u>
Acid	Soluble	> 1000 mg/L	25 °C / 77 °F

Other Information

Metal Corrosivity

Steel Corrosion Rate	Not applicable
Aluminum Corrosion Rate	Not applicable

Volatile Organic Compounds (VOC) Content
Not applicable

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Chemical name	CAS No.	Volatile organic compounds (VOC) content	CAA (Clean Air Act)
Sodium phosphate dibasic	7558-79-4	No data available	-
DPD Salt	-	Not applicable	-
Disodium EDTA	139-33-3	No data available	-

Explosive properties

Upper explosion limit No data available
Lower explosion limit No data available

Flammable properties

Flash point Not applicable
Method No information available

Flammability Limit in Air

Upper flammability limit: No data available
Lower flammability limit: No data available

Oxidizing properties

No data available.

Bulk density

No data available

Particle Size No information available

Particle Size Distribution No information available

10. STABILITY AND REACTIVITY

Reactivity

Not applicable.

Chemical stability

Stability Stable under normal conditions.

Explosion data

Sensitivity to Mechanical Impact None
Sensitivity to Static Discharge None.

Possibility of Hazardous Reactions

Possibility of Hazardous Reactions None under normal processing.

Hazardous polymerization

None under normal processing.

Conditions to avoid

Conditions to avoid None known based on information supplied.

Incompatible materials

Incompatible materials Strong acids. Strong bases. Strong oxidizing agents.

Hazardous Decomposition Products

Carbon dioxide. Carbon monoxide. Phosphorus oxides. Nitrogen oxides.

11. TOXICOLOGICAL INFORMATION

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Information on Likely Routes of Exposure

Product Information

Inhalation May cause irritation of respiratory tract.

Eye contact Causes serious eye irritation.

Skin contact Causes skin irritation.

Ingestion Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Symptoms Redness. May cause redness and tearing of the eyes.

Aggravated Medical Conditions Skin disorders. Eye disorders.

Toxicologically synergistic products None known.

Toxicokinetics, metabolism and distribution See ingredients information below.

Chemical name	Toxicokinetics, metabolism and distribution
Sodium phosphate dibasic (30 - 40%) CAS#: 7558-79-4	Phosphates are widely utilized by cells for metabolism of proteins, fats and carbohydrates.
Disodium EDTA (1 - 5%) CAS#: 139-33-3	EDTA and related compounds are poorly absorbed by the digestive system.

Product Acute Toxicity Data

Oral Exposure Route No data available

Dermal Exposure Route No data available

Inhalation (Dust/Mist) Exposure Route No data available

Inhalation (Vapor) Exposure Route No data available

Inhalation (Gas) Exposure Route No data available

Unknown Acute Toxicity

0% of the mixture consists of ingredient(s) of unknown toxicity.

Acute Toxicity Estimations (ATE)

The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral)	19,881.00 mg/kg
ATEmix (dermal)	No information available
ATEmix (inhalation-dust/mist)	No information available
ATEmix (inhalation-vapor)	No information available
ATEmix (inhalation-gas)	No information available

Ingredient Acute Toxicity Data

Oral Exposure Route

If available, see data below

Chemical name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
DPD Salt (1 - 5%) CAS#: -	Rat LD ₅₀	695 mg/kg	None reported	None reported	Outside testing
Disodium EDTA (1 - 5%)	Rat LD ₅₀	2000 mg/kg	None reported	None reported	RTECS (Registry of Toxic Effects of Chemical

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CAS#: 139-33-3					Substances)
Chemical name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Sodium phosphate dibasic (30 - 40%) CAS#: 7558-79-4	Rat LD ₅₀	17000 mg/kg	None reported	None reported	RTECS (Registry of Toxic Effects of Chemical Substances)
Disodium EDTA (1 - 5%) CAS#: 139-33-3	Rabbit LD ₅₀	2300 mg/kg	None reported	None reported	RTECS (Registry of Toxic Effects of Chemical Substances)

Dermal Exposure Route If available, see data below
Inhalation (Dust/Mist) Exposure Route If available, see data below
Inhalation (Vapor) Exposure Route If available, see data below
Inhalation (Gas) Exposure Route If available, see data below

Product Specific Target Organ Toxicity Single Exposure Data

Oral Exposure Route No data available
Dermal Exposure Route No data available
Inhalation (Dust/Mist) Exposure Route No data available
Inhalation (Vapor) Exposure Route No data available
Inhalation (Gas) Exposure Route No data available

Ingredient Specific Target Organ Toxicity Single Exposure Data

Oral Exposure Route If available, see data below
Dermal Exposure Route If available, see data below
Inhalation (Dust/Mist) Exposure Route If available, see data below
Inhalation (Vapor) Exposure Route If available, see data below
Inhalation (Gas) Exposure Route If available, see data below

Aspiration toxicity

If available, see data below

Kinematic viscosity

Not applicable

Product Skin Corrosion/Irritation Data

No data available.

Ingredient Skin Corrosion/Irritation Data

If available, see data below

Chemical name	Test method	Species	Reported dose	Exposure time	Results	Key literature references and sources for data
Sodium phosphate dibasic (30 - 40%) CAS#: 7558-79-4	Standard Draize Test	Rabbit	500 mg	24 hours	Skin irritant	RTECS (Registry of Toxic Effects of Chemical Substances)
Disodium EDTA (1 - 5%) CAS#: 139-33-3	Standard Draize Test	Rabbit	500 mg	20 hours	Not corrosive or irritating to skin	ECHA (The European Chemicals Agency)

Product Serious Eye Damage/Eye Irritation Data

No data available.

Ingredient Eye Damage/Eye Irritation Data

If available, see data below

Chemical name	Test method	Species	Reported dose	Exposure time	Results	Key literature references and sources for data
Sodium phosphate dibasic (30 - 40%)	Standard Draize Test	Rabbit	500 mg	24 hours	Eye irritant	RTECS (Registry of Toxic Effects of Chemical Substances)

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CAS#: 7558-79-4						
Disodium EDTA (1 - 5%) CAS#: 139-33-3	Standard Draize Test	Rabbit	50 mg	None reported	Mild eye irritant	ECHA (The European Chemicals Agency)

Sensitization Information

Product Sensitization Data

Skin Sensitization Exposure Route

No data available.

Respiratory Sensitization Exposure Route

No data available.

Ingredient Sensitization Data

Skin Sensitization Exposure Route

If available, see data below.

Respiratory Sensitization Exposure Route

If available, see data below.

Chronic Toxicity Information

Product Specific Target Organ Toxicity Repeat Dose Data

Oral Exposure Route

No data available.

Dermal Exposure Route

No data available.

Inhalation (Dust/Mist) Exposure Route

No data available.

Inhalation (Vapor) Exposure Route

No data available.

Inhalation (Gas) Exposure Route

No data available.

Ingredient Specific Target Organ Toxicity Repeat Exposure Data

Oral Exposure Route

If available, see data below

Dermal Exposure Route

If available, see data below

Inhalation (Dust/Mist) Exposure Route

If available, see data below

Inhalation (Vapor) Exposure Route

If available, see data below

Inhalation (Gas) Exposure Route

If available, see data below

Product Carcinogenicity Data

Oral Exposure Route

No data available

Dermal Exposure Route

No data available

Inhalation (Dust/Mist) Exposure Route

No data available

Inhalation (Vapor) Exposure Route

No data available

Inhalation (Gas) Exposure Route

No data available

Ingredient Carcinogenicity Data

Chemical name	CAS No.	ACGIH	IARC	NTP	OSHA
Sodium phosphate dibasic	7558-79-4	-	-	-	-
DPD Salt	-	-	-	-	-
Disodium EDTA	139-33-3	-	-	-	-

Legend

ACGIH (American Conference of Governmental Industrial Hygienists)	Does not apply
IARC (International Agency for Research on Cancer)	Does not apply
NTP (National Toxicology Program)	Does not apply
OSHA (Occupational Safety and Health Administration of the US Department of Labor)	Does not apply

Oral Exposure Route

If available, see data below

Dermal Exposure Route

If available, see data below

Inhalation (Dust/Mist) Exposure Route

If available, see data below

Inhalation (Vapor) Exposure Route

If available, see data below

Inhalation (Gas) Exposure Route

If available, see data below

Product Germ Cell Mutagenicity *invitro* Data

No data available.

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Ingredient Germ Cell Mutagenicity *invitro* Data

If available, see data below

Chemical name	Test	Cell Strain	Reported dose	Exposure time	Results	Key literature references and sources for data
Disodium EDTA (1 - 5%) CAS#: 139-33-3	Cytogenetic analysis	Hamster lung	200 mg/L	None reported	Positive test result for mutagenicity	RTECS (Registry of Toxic Effects of Chemical Substances)

Product Germ Cell Mutagenicity *in vivo* Data

Oral Exposure Route No data available
 Dermal Exposure Route No data available
 Inhalation (Dust/Mist) Exposure Route No data available
 Inhalation (Vapor) Exposure Route No data available
 Inhalation (Gas) Exposure Route No data available

Ingredient Germ Cell Mutagenicity *in vivo* Data

Oral Exposure Route If available, see data below
 Dermal Exposure Route If available, see data below
 Inhalation (Dust/Mist) Exposure Route If available, see data below
 Inhalation (Vapor) Exposure Route If available, see data below
 Inhalation (Gas) Exposure Route If available, see data below

Product Reproductive Toxicity Data

Oral Exposure Route No data available
 Dermal Exposure Route No data available
 Inhalation (Dust/Mist) Exposure Route No data available
 Inhalation (Vapor) Exposure Route No data available
 Inhalation (Gas) Exposure Route No data available

Ingredient Reproductive Toxicity Data

Oral Exposure Route If available, see data below
 Inhalation (Dust/Mist) Exposure Route If available, see data below
 Inhalation (Vapor) Exposure Route If available, see data below
 Inhalation (Gas) Exposure Route If available, see data below

12. ECOLOGICAL INFORMATION

Ecotoxicity

Product Ecological Data

Aquatic toxicity

Fish No data available
 Crustacea No data available
 Algae No data available

Ingredient Ecological Data

Aquatic toxicity

Fish If available, see ingredient data below

Chemical name	Exposure time	Species	Endpoint type	Reported dose	Key literature references and sources for data
Disodium EDTA (1 - 5%) CAS#: 139-33-3	96 hours	<i>Lepomis macrochirus</i>	LC ₅₀	159 mg/L	Vendor SDS

Crustacea If available, see ingredient data below

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Chemical name	Exposure time	Species	Endpoint type	Reported dose	Key literature references and sources for data
DPD Salt (1 - 5%) CAS#: -	48 Hours	<i>Daphnia magna</i>	EC ₅₀	10.8 mg/L	Internal Data

Algae If available, see ingredient data below

Chemical name	Exposure time	Species	Endpoint type	Reported dose	Key literature references and sources for data
Disodium EDTA (1 - 5%) CAS#: 139-33-3	72 Hours	None reported	EC ₅₀	10 mg/L	Vendor SDS

Other Information

Persistence and degradability

Product Biodegradability Data

No data available.

Ingredient Biodegradability Data

Chemical name	Test method	Biodegradation	Exposure time	Results
DPD Salt (1 - 5%) CAS#: -	None reported	None reported	None reported	Not determined

Bioaccumulation

Product Bioaccumulation Data

No data available.

Partition Coefficient (n-octanol/water)

log K_{ow} ~ 0

Ingredient Bioaccumulation Data

Chemical name	Test method	Exposure time	Species	Bioconcentration factor (BCF)	Results
DPD Salt (1 - 5%) CAS#: -	None reported	None reported	None reported	None reported	Not determined

Mobility

Soil Organic Carbon-Water Partition Coefficient

log K_{oc} ~ 0

Water solubility

Water solubility classification	Water solubility	Water Solubility Temperature
Soluble	> 1000 mg/L	25 °C / 77 °F

Other adverse effects

No information available.

13. DISPOSAL CONSIDERATIONS

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Waste treatment methods

Waste from residues/unused products	Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.
Contaminated packaging	Do not reuse empty containers.

14. TRANSPORT INFORMATION

<u>U.S. DOT</u>	Not regulated
<u>TDG</u>	Not regulated
<u>IATA</u>	Not regulated
<u>IMDG</u>	Not regulated
Note:	No special precautions necessary.

Additional information

There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is not in a reagent set or kit, the classification given above applies.
If the item is part of a reagent set or kit the classification would change to the following:
UN3316 Chemical Kit, Hazard Class 9, Packing Group II or III.
If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

National Inventories

TSCA	Complies
DSL/NDSL	Complies

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

International Inventories

EINECS/ELINCS	Complies
ENCS	Complies
IECSC	Complies
KECL	Complies
PICCS	Complies
TCSI	Complies
AICS	Complies
NZIoC	Complies

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
TCSI - Taiwan Chemical Substances Inventory
AICS - Australian Inventory of Chemical Substances
NZIoC - New Zealand Inventory of Chemicals

US Federal Regulations

SARA 313

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Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic Health Hazard	No
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

CWA (Clean Water Act)

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Sodium phosphate dibasic 7558-79-4	5000 lb	-	-	X

CERCLA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

Chemical name	Hazardous Substances RQs	CERCLA/SARA RQ	Reportable Quantity (RQ)
Sodium phosphate dibasic 7558-79-4	5000 lb	-	RQ 5000 lb final RQ RQ 2270 kg final RQ

US State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals

New Jersey Trade Secret Registry Number 80100131-5001 (Carboxylate Salt) New Jersey Trade Secret Registry Number 80100131-5002 (DPD Salt) New York Trade Secret Registry Number 478 (DPD Salt) New York Trade Secret Registry Number 479 (Carboxylate Salt) This product complies with Pennsylvania Trade Secret Regulations. This product is registered as a trade secret in the state of Illinois. This product is registered as a trade secret in the state of Massachusetts. This product is registered as a trade secret in the state of New York.

U.S. State Right-to-Know Regulations

Chemical name	New Jersey	Massachusetts	Pennsylvania
Sodium phosphate dibasic 7558-79-4	X	X	X

U.S. EPA Label Information

Chemical name	FIFRA	FDA
Sodium phosphate dibasic	180.0910	21 CFR 182.1778,21 CFR 182.6290,21 CFR 182.6778,21 CFR 182.8778
Disodium EDTA	180.0940	-

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16. OTHER INFORMATION, INCLUDING DATE OF PREPARATION OF THE LAST REVISION

Special Comments

None

Additional information

Global Automotive Declarable Substance List (GADSL)

Not applicable

NFPA and HMIS Classifications

NFPA	Health hazards - 2	Flammability - 0	Instability - 0	Physical and Chemical Properties -
HMIS	Health hazards - 2	Flammability - 0	Physical Hazards - 0	Personal protection - X - See section 8 for more information

Key or legend to abbreviations and acronyms used in the safety data sheet

NIOSH IDLH	<i>Immediately Dangerous to Life or Health</i>
ACGIH	ACGIH (American Conference of Governmental Industrial Hygienists)
NDF	<i>no data</i>

Legend - Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)
MAC	Maximum Allowable Concentration	Ceiling	Ceiling Limit Value
X	Listed	Vacated	These values have no official status. The only binding levels of contaminants are those listed in the final OSHA PEL. These lists are for reference purposes only. Please note that some reference state regulations of these "liberated" exposure limits in their state regulations.
SKN*	Skin designation	SKN+	Skin sensitization
RSP+	Respiratory sensitization	**	Hazard Designation
C	Carcinogen	R	Reproductive toxicant
M	mutagen		

Prepared By Hach Product Compliance Department

Issue Date 09-Aug-2016

Revision Date 12-Feb-2018

Revision Note None

Disclaimer

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

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HACH COMPANY©2017

End of Safety Data Sheet



Be Right™

SAFETY DATA SHEET

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1. IDENTIFICATION

Product identifier

Product Name DPD Total Chlorine Reagent

Other means of identification

Product Code(s) 1406499

Safety data sheet number M00110

HMRIC # HMIRA Registry Number 9936 Filed 2016-04-11

Recommended use of the chemical and restrictions on use

Recommended Use Laboratory reagent. Indicator for total chlorine.

Uses advised against None.

Restrictions on use None.

Details of the supplier of the safety data sheet

Manufacturer Address

Hach Company P.O.Box 389 Loveland, CO 80539 USA +1(970) 669-3050

Emergency telephone number

+1(303) 623-5716 - 24 Hour Service +1(515)232-2533 - 8am - 4pm CST

2. HAZARDS IDENTIFICATION

Classification

Regulatory Status

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2A

Hazards not otherwise classified (HNOC)

Not applicable

Label elements

Signal word - Warning



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Hazard statements

H315 - Causes skin irritation
H319 - Causes serious eye irritation

Precautionary statements

P302 + P352 - IF ON SKIN: Wash with plenty of soap and water
P332 + P313 - If skin irritation occurs: Get medical advice/attention
P362 - Take off contaminated clothing and wash before reuse
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P337 + P313 - If eye irritation persists: Get medical advice/attention

Other Hazards Known

Not applicable

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance

Not applicable

Mixture

Chemical Family Mixture.

Percent ranges are used where confidential product information is applicable.

Chemical name	CAS No.	Percent Range	HMRIC #
Sodium phosphate dibasic	7558-79-4	20 - 30%	-
Potassium iodide (KI)	7681-11-0	20 - 30%	-
DPD Salt	-	1 - 5%	-
Glycine, N,N-1,2-ethanediylbis[N-(carboxymethyl)-, disodium salt, dihydrate	6381-92-6	<1%	-

4. FIRST AID MEASURES

Description of first aid measures

General advice	Show this safety data sheet to the doctor in attendance.
Inhalation	Remove to fresh air. Get medical attention immediately if symptoms occur.
Eye contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Keep eye wide open while rinsing. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists. Do not rub affected area.
Skin contact	Wash off immediately with soap and plenty of water for at least 15 minutes. Get medical attention if irritation develops and persists.
Ingestion	Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. Do NOT induce vomiting. Call a physician.
Self-protection of the first aider	Avoid contact with skin, eyes or clothing.

Most important symptoms and effects, both acute and delayed

Symptoms	Burning sensation.
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Indication of any immediate medical attention and special treatment needed

Note to physicians	Treat symptomatically.
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5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.
Unsuitable Extinguishing Media	Caution: Use of water spray when fighting fire may be inefficient.
Specific hazards arising from the chemical	No information available.
Hazardous combustion products	Carbon monoxide, Carbon dioxide. Iodine compounds. Phosphorus oxides. Potassium oxides. Sodium monoxide. Nitrogen oxides.
Special protective equipment for fire-fighters	Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear.

6. ACCIDENTAL RELEASE MEASURES

U.S. Notice	Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance. Outside of the US, only persons properly qualified according to state or local regulations should respond to a spill involving chemicals.
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Personal precautions, protective equipment and emergency procedures

Personal precautions	Avoid contact with skin, eyes or clothing. Ensure adequate ventilation. Use personal protective equipment as required.
Other Information	Refer to protective measures listed in Sections 7 and 8.

Environmental precautions

Environmental precautions Prevent further leakage or spillage if safe to do so.

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Pick up and transfer to properly labeled containers.

Prevention of secondary hazards Clean contaminated objects and areas thoroughly observing environmental regulations.

Reference to other sections See section 8 for more information. See section 13 for more information.

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. Do not eat, drink or smoke when using this product. Take off contaminated clothing and wash before reuse.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep containers tightly closed in a dry, cool and well-ventilated place.

Flammability class Not applicable

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines

Chemical name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Potassium iodide (KI) CAS#: 7681-11-0	TWA: 0.01 ppm	NDF	NDF

Appropriate engineering controls

Engineering Controls Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

Respiratory protection No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

Hand Protection Wear suitable gloves. Impervious gloves.

Eye/face protection If splashes are likely to occur, wear safety glasses with side-shields.

Skin and body protection Wear suitable protective clothing. Long sleeved clothing.

General Hygiene Considerations Wear suitable gloves and eye/face protection. Do not eat, drink or smoke when using this product. Avoid contact with skin, eyes or clothing.

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Environmental exposure controls Local authorities should be advised if significant spillages cannot be contained. Do not allow into any sewer, on the ground or into any body of water.

Thermal hazards None under normal processing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state	Solid	Color	White to light pink
Appearance	powder	Odor threshold	No data available
Odor	Odorless		

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
Molecular weight	No data available	
pH	No data available	
Melting point/freezing point	145 °C / 293 °F	
Boiling point / boiling range	No data available	
Evaporation rate	Not applicable	
Vapor pressure	Not applicable	
Vapor density (air = 1)	Not applicable	
Specific gravity (water = 1 / air = 1)	1.79	
Partition Coefficient (n-octanol/water)	log K _{ow} ~ 0	
Soil Organic Carbon-Water Partition Coefficient	log K _{oc} ~ 0	
Autoignition temperature	No data available	
Decomposition temperature	No data available	
Dynamic viscosity	Not applicable	
Kinematic viscosity	Not applicable	

Solubility(ies)

Water solubility

<u>Water solubility classification</u>	<u>Water solubility</u>	<u>Water Solubility Temperature</u>
Soluble	> 1000 mg/L	25 °C / 77 °F

Solubility in other solvents

<u>Chemical Name</u>	<u>Solubility classification</u>	<u>Solubility</u>	<u>Solubility Temperature</u>
None reported	No information available	No data available	No information available

Other Information

Metal Corrosivity

Steel Corrosion Rate	0.97 mm/yr / 0.04 in/yr
Aluminum Corrosion Rate	0.15 mm/yr / 0.01 in/yr

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Volatile Organic Compounds (VOC) Content

Not applicable

Chemical name	CAS No.	Volatile organic compounds (VOC) content	CAA (Clean Air Act)
Sodium phosphate dibasic	7558-79-4	No data available	-
Potassium iodide (KI)	7681-11-0	No data available	-
DPD Salt	-	Not applicable	-
Glycine, N,N-1,2-ethanediybis[N-(carboxymeth yl)-, disodium salt, dihydrate	6381-92-6	Not applicable	-

Explosive properties

Upper explosion limit
Lower explosion limit

No data available
No data available

Flammable properties

Flash point
Method

Not applicable
No information available

Flammability Limit in Air

Upper flammability limit:
Lower flammability limit:

No data available
No data available

Oxidizing properties

No data available.

Bulk density

No data available

Particle Size

No information available

Particle Size Distribution

No information available

10. STABILITY AND REACTIVITY

Reactivity

Not applicable.

Chemical stability

Stability

Stable under normal conditions.

Explosion data

Sensitivity to Mechanical Impact None
Sensitivity to Static Discharge None.

Possibility of Hazardous Reactions

Possibility of Hazardous Reactions None under normal processing.

Hazardous polymerization

None under normal processing.

Conditions to avoid

Conditions to avoid

None known based on information supplied.

Incompatible materials

Incompatible materials

Strong acids. Strong bases. Strong oxidizing agents.

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Hazardous Decomposition Products

Carbon dioxide. Carbon monoxide. Iodine compounds. Phosphorus oxides. Potassium oxide. Nitrogen oxides.

11. TOXICOLOGICAL INFORMATION

Information on Likely Routes of Exposure

Product Information

Inhalation May cause irritation of respiratory tract.

Eye contact Causes serious eye irritation.

Skin contact Causes skin irritation.

Ingestion Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

Symptoms Redness. May cause redness and tearing of the eyes.

Aggravated Medical Conditions Skin disorders. Eye disorders.

Toxicologically synergistic products None known.

Toxicokinetics, metabolism and distribution See ingredients information below.

Chemical name	Toxicokinetics, metabolism and distribution
Sodium phosphate dibasic (20 - 30%) CAS#: 7558-79-4	Phosphates are widely utilized by cells for metabolism of proteins, fats and carbohydrates.
Potassium iodide (KI) (20 - 30%) CAS#: 7681-11-0	May cross placenta and be excreted in breast milk. May react synergistically with mercury.
Glycine, N,N-1,2-ethanediylbis [N-(carboxymethyl)-, disodium salt, dihydrate (<1%) CAS#: 6381-92-6	EDTA and related compounds are poorly absorbed by the digestive system.

Product Acute Toxicity Data

Oral Exposure Route

Test data reported below

Endpoint type	Reported dose	Toxicological effects	Key literature references and sources for data
Rat LD ₅₀	4700 mg/kg	Behavioral Flaccid muscle tone Lethargy Prostration Eye Chromodacryorrhea Ptosis Gastrointestinal Abnormalities of the gastrointestinal tract Diarrhea Liver Abnormalities of the liver Lungs, Thorax, or Respiration Abnormalities of the lungs Dyspnea Red or brown staining of the nose/mouth area Nutritional and Gross Metabolic Soiling of the anogenital area Wetness of the anogenital area Reproductive Skin and Appendages Piloerection	Outside testing

Dermal Exposure Route

No data available

Inhalation (Dust/Mist) Exposure Route

No data available

Inhalation (Vapor) Exposure Route

No data available

Inhalation (Gas) Exposure Route

No data available

Unknown Acute Toxicity

0% of the mixture consists of ingredient(s) of unknown toxicity.

Acute Toxicity Estimations (ATE)

ATEmix (oral)	No information available
ATEmix (dermal)	No information available
ATEmix (inhalation-dust/mist)	No information available
ATEmix (inhalation-vapor)	No information available
ATEmix (inhalation-gas)	No information available

Ingredient Acute Toxicity Data

Oral Exposure Route

If available, see data below

Chemical name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Potassium iodide (KI) (20 - 30%) CAS#: 7681-11-0	Rat LD ₅₀	2779 mg/kg	None reported	None reported	RTECS (Registry of Toxic Effects of Chemical Substances)

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DPD Salt (1 - 5%) CAS#: -	Rat LD ₅₀	695 mg/kg	None reported	None reported	Outside testing
Glycine, N,N-1,2-ethanediylbis [N-(carboxymethyl)-, disodium salt, dihydrate (<1%) CAS#: 6381-92-6	Rat LD ₅₀	2300 mg/kg	None reported	None reported	RTECS (Registry of Toxic Effects of Chemical Substances)
Chemical name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Sodium phosphate dibasic (20 - 30%) CAS#: 7558-79-4	Rat LD ₅₀	17000 mg/kg	None reported	None reported	RTECS (Registry of Toxic Effects of Chemical Substances)
Potassium iodide (KI) (20 - 30%) CAS#: 7681-11-0	Mouse LD ₅₀	1000 mg/kg	None reported	None reported	Vendor SDS

Dermal Exposure Route

If available, see data below

Inhalation (Dust/Mist) Exposure Route

If available, see data below

Inhalation (Vapor) Exposure Route

If available, see data below

Inhalation (Gas) Exposure Route

If available, see data below

Product Specific Target Organ Toxicity Single Exposure Data

Oral Exposure Route

Dermal Exposure Route

No data available

Inhalation (Dust/Mist) Exposure Route

No data available

Inhalation (Vapor) Exposure Route

No data available

Inhalation (Gas) Exposure Route

No data available

Ingredient Specific Target Organ Toxicity Single Exposure Data

Oral Exposure Route

If available, see data below

Chemical name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Potassium iodide (KI) (20 - 30%) CAS#: 7681-11-0	Mouse LD _{Lo}	1862 mg/kg	None reported	Lungs, Thorax, or Respiration Dyspnea	RTECS (Registry of Toxic Effects of Chemical Substances)

Dermal Exposure Route

If available, see data below

Inhalation (Dust/Mist) Exposure Route

If available, see data below

Inhalation (Vapor) Exposure Route

If available, see data below

Inhalation (Gas) Exposure Route

If available, see data below

Aspiration toxicity

If available, see data below

Kinematic viscosity

Not applicable

Product Skin Corrosion/Irritation Data

No data available.

Ingredient Skin Corrosion/Irritation Data

If available, see data below

Chemical name	Test method	Species	Reported dose	Exposure time	Results	Key literature references and sources for data
Sodium phosphate dibasic (20 - 30%) CAS#: 7558-79-4	Standard Draize Test	Rabbit	500 mg	24 hours	Skin irritant	RTECS (Registry of Toxic Effects of Chemical Substances)
Potassium iodide (KI)	Standard Draize	Rabbit	None	None	Skin irritant	No information

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(20 - 30%) CAS#: 7681-11-0	Test		reported	reported		available
Glycine, N,N-1,2-ethanediylbis [N-(carboxymethyl)-, disodium salt, dihydrate (<1%) CAS#: 6381-92-6	Standard Draize Test	Rabbit	500 mg	20 hours	Not corrosive or irritating to skin	ECHA (The European Chemicals Agency)

Product Serious Eye Damage/Eye Irritation Data

No data available.

Ingredient Eye Damage/Eye Irritation Data

If available, see data below

Chemical name	Test method	Species	Reported dose	Exposure time	Results	Key literature references and sources for data
Sodium phosphate dibasic (20 - 30%) CAS#: 7558-79-4	Standard Draize Test	Rabbit	500 mg	24 hours	Eye irritant	RTECS (Registry of Toxic Effects of Chemical Substances)
Potassium iodide (KI) (20 - 30%) CAS#: 7681-11-0	None reported	Rabbit	None reported	None reported	Eye irritant	HSDB (Hazardous Substances Data Bank)
Glycine, N,N-1,2-ethanediylbis [N-(carboxymethyl)-, disodium salt, dihydrate (<1%) CAS#: 6381-92-6	Standard Draize Test	Rabbit	50 mg	None reported	Mild eye irritant	ECHA (The European Chemicals Agency)

Sensitization Information

Product Sensitization Data

Skin Sensitization Exposure Route

No data available.

Respiratory Sensitization Exposure Route

No data available.

Ingredient Sensitization Data

Skin Sensitization Exposure Route

If available, see data below.

Chemical name	Test method	Species	Results	Key literature references and sources for data
Potassium iodide (KI) (20 - 30%) CAS#: 7681-11-0	Patch test	Human	Not confirmed to be a skin sensitizer	ERMA (New Zealand's Environmental Risk Management Authority)

Respiratory Sensitization Exposure Route

If available, see data below.

Chronic Toxicity Information

Product Specific Target Organ Toxicity Repeat Dose Data

Oral Exposure Route

No data available.

Dermal Exposure Route

No data available.

Inhalation (Dust/Mist) Exposure Route

No data available.

Inhalation (Vapor) Exposure Route

No data available.

Inhalation (Gas) Exposure Route

No data available.

Ingredient Specific Target Organ Toxicity Repeat Exposure Data

Oral Exposure Route

If available, see data below

Dermal Exposure Route

If available, see data below

Inhalation (Dust/Mist) Exposure Route

If available, see data below

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Inhalation (Vapor) Exposure Route
Inhalation (Gas) Exposure Route

If available, see data below
If available, see data below

Product Carcinogenicity Data

Oral Exposure Route
Dermal Exposure Route
Inhalation (Dust/Mist) Exposure Route
Inhalation (Vapor) Exposure Route
Inhalation (Gas) Exposure Route

No data available
No data available
No data available
No data available
No data available

Ingredient Carcinogenicity Data

Chemical name	CAS No.	ACGIH	IARC	NTP	OSHA
Sodium phosphate dibasic	7558-79-4	-	-	-	-
Potassium iodide (KI)	7681-11-0	-	-	-	-
DPD Salt	-	-	-	-	-
Glycine, N,N-1,2-ethanediylbis[N-(c arboxymethyl)-, disodium salt, dihydrate	6381-92-6	-	-	-	-

Legend

ACGIH (American Conference of Governmental Industrial Hygienists)	Does not apply
IARC (International Agency for Research on Cancer)	Does not apply
NTP (National Toxicology Program)	Does not apply
OSHA (Occupational Safety and Health Administration of the US Department of Labor)	Does not apply

Oral Exposure Route
Dermal Exposure Route
Inhalation (Dust/Mist) Exposure Route
Inhalation (Vapor) Exposure Route
Inhalation (Gas) Exposure Route

If available, see data below
If available, see data below
If available, see data below
If available, see data below
If available, see data below

Product Germ Cell Mutagenicity *invitro* Data

No data available.

Ingredient Germ Cell Mutagenicity *invitro* Data

If available, see data below

Chemical name	Test	Cell Strain	Reported dose	Exposure time	Results	Key literature references and sources for data
Potassium iodide (KI) (20 - 30%) CAS#: 7681-11-0	Cytogenetic analysis	Rat ascites tumor	500 mg/kg	None reported	Positive test result for mutagenicity	RTECS (Registry of Toxic Effects of Chemical Substances)
Glycine, N,N-1,2-ethanediylbis [N-(carboxymethyl)-, disodium salt, dihydrate (<1%) CAS#: 6381-92-6	Cytogenetic analysis	Hamster lung	200 mg/L	None reported	Positive test result for mutagenicity	RTECS (Registry of Toxic Effects of Chemical Substances)

Product Germ Cell Mutagenicity *invivo* Data

Oral Exposure Route
Dermal Exposure Route
Inhalation (Dust/Mist) Exposure Route
Inhalation (Vapor) Exposure Route
Inhalation (Gas) Exposure Route

No data available
No data available
No data available
No data available
No data available

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Ingredient Germ Cell Mutagenicity *in vivo* Data

Oral Exposure Route

If available, see data below

Dermal Exposure Route

If available, see data below

Inhalation (Dust/Mist) Exposure Route

If available, see data below

Inhalation (Vapor) Exposure Route

If available, see data below

Inhalation (Gas) Exposure Route

If available, see data below

Product Reproductive Toxicity Data

Oral Exposure Route

No data available

Dermal Exposure Route

No data available

Inhalation (Dust/Mist) Exposure Route

No data available

Inhalation (Vapor) Exposure Route

No data available

Inhalation (Gas) Exposure Route

No data available

Ingredient Reproductive Toxicity Data

Oral Exposure Route

If available, see data below

Chemical name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Potassium iodide (KI) (20 - 30%) CAS#: 7681-11-0	Human TD _{Lo}	2700 mg/kg	39 weeks	Specific Developmental Abnormalities Endocrine System	RTECS (Registry of Toxic Effects of Chemical Substances)
Chemical name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Potassium iodide (KI) (20 - 30%) CAS#: 7681-11-0	Human TD _{Lo}	3240 mg/kg	39 weeks	Effects on Newborn Other neonatal measures or effects Physical Specific Developmental Abnormalities Endocrine system	RTECS (Registry of Toxic Effects of Chemical Substances)

Inhalation (Dust/Mist) Exposure Route

If available, see data below

Inhalation (Vapor) Exposure Route

If available, see data below

Inhalation (Gas) Exposure Route

If available, see data below

12. ECOLOGICAL INFORMATION

Ecotoxicity

Not considered to be harmful to aquatic life

Product Ecological Data

Aquatic toxicity

Fish

No data available

Crustacea

No data available

Algae

No data available

Ingredient Ecological Data

Aquatic toxicity

Fish

If available, see ingredient data below

Chemical name	Exposure time	Species	Endpoint type	Reported dose	Key literature references and sources for data
Potassium iodide (KI) (20 - 30%) CAS#: 7681-11-0	96 hours	<i>Oncorhynchus mykiss</i>	LC ₅₀	896 mg/L	PEEN (Pan European Ecological Network)
Glycine, N,N-1,2-ethanediylbis [N-(carboxymethyl)-,	96 hours	<i>Lepomis macrochirus</i>	LC ₅₀	159 mg/L	Vendor SDS

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disodium salt, dihydrate (<1%) CAS#: 6381-92-6					
---------------------------------------------------------	--	--	--	--	--

Crustacea If available, see ingredient data below

Chemical name	Exposure time	Species	Endpoint type	Reported dose	Key literature references and sources for data
DPD Salt (1 - 5%) CAS#: -	48 Hours	<i>Daphnia magna</i>	EC ₅₀	10.8 mg/L	Internal Data

Algae If available, see ingredient data below

Chemical name	Exposure time	Species	Endpoint type	Reported dose	Key literature references and sources for data
Glycine, N,N-1,2-ethanediylbis [N-(carboxymethyl)-, disodium salt, dihydrate (<1%) CAS#: 6381-92-6	72 Hours	None reported	EC ₅₀	10 mg/L	Vendor SDS

Other Information

Persistence and degradability

Product Biodegradability Data

No data available.

Ingredient Biodegradability Data

Chemical name	Test method	Biodegradation	Exposure time	Results
DPD Salt (1 - 5%) CAS#: -	None reported	None reported	None reported	Not determined

Bioaccumulation

Product Bioaccumulation Data

No data available.

Partition Coefficient (n-octanol/water)

log K_{ow} ~ 0

Ingredient Bioaccumulation Data

Chemical name	Test method	Exposure time	Species	Bioconcentration factor (BCF)	Results
DPD Salt (1 - 5%) CAS#: -	None reported	None reported	None reported	None reported	Not determined
Glycine, N,N-1,2-ethanediylbis [N-(carboxymethyl)-, disodium salt, dihydrate (<1%) CAS#: 6381-92-6	None reported	None reported	None reported	None reported	Not determined

Mobility

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Soil Organic Carbon-Water Partition Coefficient

log K_{oc} ~ 0

Water solubility

<u>Water solubility classification</u>	<u>Water solubility</u>	<u>Water Solubility Temperature</u>
Soluble	> 1000 mg/L	25 °C / 77 °F

Other adverse effects

No information available.

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Waste from residues/unused products

Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.

Contaminated packaging

Do not reuse empty containers.

14. TRANSPORT INFORMATION

U.S. DOT

Not regulated

TDG

Not regulated

IATA

Not regulated

IMDG

Not regulated

Note:

No special precautions necessary.

Additional information

There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods.

If the item is not in a reagent set or kit, the classification given above applies.

If the item is part of a reagent set or kit the classification would change to the following:

UN3316 Chemical Kit, Hazard Class 9, Packing Group II or III.

If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

National Inventories

TSCA

Complies

DSL/NDSL

Complies

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

International Inventories

EINECS/ELINCS

Complies

ENCS

Complies

IECSC

Complies

KECL

Complies

PICCS

Complies

TCSI

Complies

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AICS Complies
NZIoC Complies

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
TCSI - Taiwan Chemical Substances Inventory
AICS - Australian Inventory of Chemical Substances
NZIoC - New Zealand Inventory of Chemicals

US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic Health Hazard	No
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

CWA (Clean Water Act)

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Sodium phosphate dibasic 7558-79-4	5000 lb	-	-	X

CERCLA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

Chemical name	Hazardous Substances RQs	CERCLA/SARA RQ	Reportable Quantity (RQ)
Sodium phosphate dibasic 7558-79-4	5000 lb	-	RQ 5000 lb final RQ RQ 2270 kg final RQ

US State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals

New Jersey Trade Secret Registry Number 80100131-5001 (Carboxylate Salt) New Jersey Trade Secret Registry Number 80100131-5002 (DPD Salt) New York Trade Secret Registry Number 478 (DPD Salt) New York Trade Secret Registry Number 479 (Carboxylate Salt) This product complies with Pennsylvania Trade Secret Regulations. This product is registered as a trade secret in the state of Illinois. This product is registered as a trade secret in the state of Massachusetts. This product is registered as a trade secret in the state of New York.

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U.S. State Right-to-Know Regulations

Chemical name	New Jersey	Massachusetts	Pennsylvania
Sodium phosphate dibasic 7558-79-4	X	X	X

U.S. EPA Label Information

Chemical name	FIFRA	FDA
Sodium phosphate dibasic	180.0910	21 CFR 182.1778,21 CFR 182.6290,21 CFR 182.6778,21 CFR 182.8778
Potassium iodide (KI)	180.0940	21 CFR 184.1634

16. OTHER INFORMATION, INCLUDING DATE OF PREPARATION OF THE LAST REVISION

Special Comments

None

Additional information

Global Automotive Declarable Substance List (GADSL)

Not applicable

NFPA and HMIS Classifications

NFPA	Health hazards - 2	Flammability - 0	Instability - 0	Physical and Chemical Properties -
HMIS	Health hazards - 2	Flammability - 0	Physical Hazards - 0	Personal protection - X - See section 8 for more information

Key or legend to abbreviations and acronyms used in the safety data sheet

NIOSH IDLH Immediately Dangerous to Life or Health
ACGIH ACGIH (American Conference of Governmental Industrial Hygienists)
NDF no data

Legend - Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

TWA	TWA (time-weighted average)	STEL	STEL (Short Term Exposure Limit)
MAC	Maximum Allowable Concentration	Ceiling	Ceiling Limit Value
X	Listed	Vacated	These values have no official status. The only binding levels of contaminants are those listed in the final OSHA PEL. These lists are for reference purposes only. Please note that some reference state regulations of these "liberated" exposure limits in their state regulations.
SKN*	Skin designation	SKN+	Skin sensitization
RSP+	Respiratory sensitization	**	Hazard Designation
C	Carcinogen	R	Reproductive toxicant
M	mutagen		

Prepared By Hach Product Compliance Department

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Issue Date 19-Oct-2016

Revision Date 12-Feb-2018

Revision Note None

Disclaimer

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

HACH COMPANY©2017

End of Safety Data Sheet



Ammonia Nitrogen Test Kit

NI-SA (2428700)

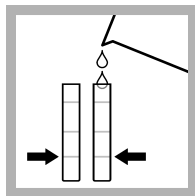
DOC326.98.00007

Test preparation

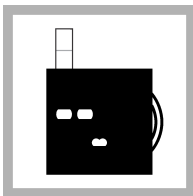
CAUTION: ⚠️ *Review the Safety Data Sheets (MSDS/SDS) for the chemicals that are used. Use the recommended personal protective equipment.*

- Put the color disc on the center pin in the color comparator box (numbers to the front).
- Use sunlight or a lamp as a light source to find the color match with the color comparator box.
- Rinse the tubes with sample before the test. Rinse the tubes with deionized water after the test.
- If the color match is between two segments, use the value that is in the middle of the two segments.
- If the color disc becomes wet internally, pull apart the flat plastic sides to open the color disc. Remove the thin inner disc. Dry all parts with a soft cloth. Assemble when fully dry.
- To verify the test accuracy, use a standard solution as the sample.
- This test kit is for seawater. If used for brackish or fresh water, the test kit gives a higher than actual value. The error in brackish water is usually less than 10%. The error in low salinity or fresh water is a maximum 16%.
- This test is very sensitive to contamination. Try to get the same result on a second test. Fully rinse the tubes with fresh sample before the second test. The reagents clean the tubes during the first test.
- To increase the range of this test to 4 mg/L $\text{NH}_3\text{-N}$, dilute the sample as follows. Use a 3-mL syringe to add 2.5 mL of sample to each tube. Dilute the sample to the 5-mL mark with deionized water. Use the diluted sample in the test procedure and multiply the result by 2.

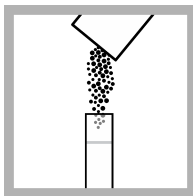
Test procedure—Ammonia-nitrogen (0–2.0 mg/L $\text{NH}_3\text{-N}$)



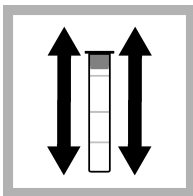
1. Fill two tubes to the first line (5 mL) with sample.



2. Put one tube into the left opening of the color comparator box.



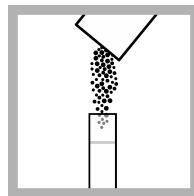
3. Add one Ammonia Salicylate Reagent Powder Pillow to the second tube.



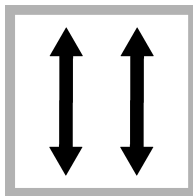
4. Put a stopper on the tube. Shake until the powder fully dissolves.



5. Wait 3 minutes.



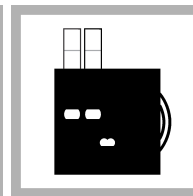
6. Add one Ammonia Cyanurate Reagent Powder Pillow to the same tube. Put a stopper on the tube.



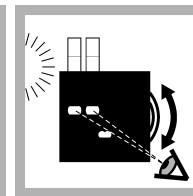
7. Shake until the powder fully dissolves.



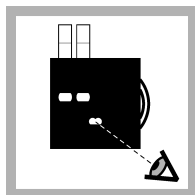
8. Wait 15 minutes. A green color develops.



9. Put the second tube into the color comparator box.



10. Hold the color comparator box in front of a light source. Turn the color disc to find the color match.



11. Read the result in mg/L in the scale window.

Replacement items

Description	Unit	Item no.
Ammonia Salicylate Reagent Powder Pillows, 5 mL	50/pkg	2395266
Ammonia Cyanurate Reagent Powder Pillows, 5 mL	50/pkg	2395466
Color disc, ammonia nitrogen, salicylate, 0–2.0 mg/L	each	9261300
Color comparator box	each	173200
Glass viewing tubes, glass, 18 mm	6/pkg	173006
Stoppers for 18-mm glass tubes and AccuVac Ampuls	6/pkg	173106

Optional items

Description	Unit	Item no.
Nitrogen ammonia standard solution, 1.0 mg/L $\text{NH}_3\text{-N}$	500 mL	189149
Water, deionized	500 mL	27249
Syringe, Luer-Lok® Tip, 3 mL	each	4321300

Calculate the mg/L NH₃ and mg/L NH₄⁺

Ammonia in water is in the form of the ammonium ion (NH₄⁺) and un-ionized ammonia (NH₃). NH₃ is toxic to fish. [Table 1](#) shows that the percent of NH₃ increases as the pH and temperature increase. This test kit measures both NH₄⁺ and NH₃ as ammonia nitrogen (NH₃-N).

To calculate the mg/L NH₃ in the sample, refer to [Table 1](#) and the equation that follows.

$$\text{mg/L NH}_3 = ((\text{mg/L NH}_3\text{-N} \times \text{percent NH}_3 \text{ from Table 1}) \div 100) \times 1.2$$

Example: The test result was 1.6 mg/L NH₃-N. The sample pH was 7.6 and the sample temperature was 16 °C. The mg/L NH₃ is $((1.6 \times 1.16) \div 100) \times 1.2 = 0.02 \text{ mg/L NH}_3$.

To calculate the mg/L NH₄⁺ in the sample, refer to [Table 1](#) and the equation that follows.

$$\text{mg/L NH}_4^+ = ((\text{mg/L NH}_3\text{-N} \times (100 - \text{percent NH}_3 \text{ from Table 1})) \div 100) \times 1.3$$

Example: The test result was 1.6 mg/L NH₃-N. The sample pH was 7.6 and the sample temperature was 16 °C. The mg/L NH₄⁺ is $((1.6 \times (100 - 1.16)) \div 100) \times 1.3 = 2.056 \text{ mg/L NH}_4^+$.

Table 1 Percent of NH₃ in water

pH	16 °C	18 °C	20 °C	22 °C	24 °C	26 °C	28 °C	30 °C	32 °C
7.0	0.29	0.34	0.39	0.46	0.52	0.60	0.69	0.80	0.91
7.2	0.46	0.54	0.62	0.82	0.83	0.96	1.10	1.26	1.44
7.4	0.73	0.85	0.98	1.14	1.31	1.50	1.73	1.98	2.26
7.6	1.16	1.34	1.55	1.79	2.06	2.36	2.71	3.10	3.53
7.8	1.82	2.11	2.44	2.81	3.22	3.70	4.23	4.82	5.48
8.0	2.86	3.30	3.81	4.38	5.02	5.74	6.54	7.43	8.42
8.2	4.45	5.14	5.90	6.76	7.72	8.80	9.98	11.29	12.72
8.4	6.88	7.90	9.04	10.31	11.71	13.26	14.95	16.78	18.77
8.6	10.48	11.97	13.61	15.41	17.37	19.50	21.78	24.22	26.80
8.8	15.66	17.73	19.98	22.41	25.00	27.74	30.62	33.62	36.72
9.0	22.73	25.46	28.36	31.40	34.56	37.83	41.16	44.53	47.91
9.2	31.80	35.12	38.55	42.04	45.57	49.09	52.58	55.99	59.31
9.4	42.49	46.18	49.85	53.48	57.02	60.45	63.73	66.85	69.79
9.6	53.94	57.62	61.17	64.56	67.77	70.78	73.58	76.17	78.55
9.8	64.99	68.31	71.40	74.28	76.92	79.33	81.53	83.51	85.30
10.0	74.63	77.35	79.83	82.07	84.08	85.88	87.49	88.92	90.19
10.2	82.34	84.41	86.25	87.88	89.33	90.60	91.73	92.71	93.58





Be Right™

SAFETY DATA SHEET

Issue Date 27-Nov-2017

Revision Date 27-Nov-2017

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1. IDENTIFICATION

Product identifier

Product Name Ammonia Nitrogen 1 Reagent

Other means of identification

Product Code(s) 1455523

Safety data sheet number M00944

Recommended use of the chemical and restrictions on use

Recommended Use Determination of ammonium nitrogen.

Uses advised against No information available.

Restrictions on use None.

Details of the supplier of the safety data sheet

Manufacturer Address

Hach Company P.O.Box 389 Loveland,
CO 80539 USA +1(970) 669-3050

Emergency telephone number

+1(303) 623-5716 - 24 Hour Service +1(515)232-2533 - 8am - 4pm CST

2. HAZARDS IDENTIFICATION

Classification

Regulatory Status

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Corrosive to metals	Category 1
Skin corrosion/irritation	Category 1 Sub-category A
Serious eye damage/eye irritation	Category 1
Respiratory sensitization	
Skin sensitization	
Mutagenicity	
Carcinogenicity	
Reproductive toxicity	
Specific target organ toxicity (single exposure)	
Specific target organ toxicity (repeated exposure)	

Hazards not otherwise classified (HNOC)

Not applicable

Label elements

Signal word - Danger

Product Code(s) 1455523
Issue Date 27-Nov-2017
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Product Name Ammonia Nitrogen 1 Reagent
Revision Date 27-Nov-2017
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Hazard statements

H290 - May be corrosive to metals
H314 - Causes severe skin burns and eye damage

Precautionary statements

P260 - Do not breathe dust/fume/gas/mist/vapors/spray
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P301 + P330 + P331 - IF SWALLOWED: rinse mouth. Do NOT induce vomiting
P303 + P361 + P353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
P363 - Wash contaminated clothing before reuse
P304 + P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
P405 - Store locked up
P501 - Dispose of contents/ container to an approved waste disposal plant
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a POISON CENTER or doctor/physician
P234 - Keep only in original container
P390 - Absorb spillage to prevent material damage

Other Information

Not applicable

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance

Not applicable

Mixture

Chemical Family Mixture.
Chemical nature aqueous solution.

Percent ranges are used where confidential product information is applicable.

Chemical name	CAS No.	Percent Range	HMRIC #
Sodium hydroxide	1310-73-2	3 - 7%	-

4. FIRST AID MEASURES

Description of first aid measures

General advice	See section 8 for PPE that may be required during handling. Do not breathe dust/fume/gas/mist/vapors/spray. Do not get in eyes, on skin, or on clothing. In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible). If no local exhaust use approved fume hood and/or respirator. If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician. Remove from exposure, lie down. Immediate medical attention is required. IF IN EYES: Flush eyes for at least 15 minutes. IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
Eye contact	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Call a physician immediately.
Skin contact	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a physician immediately.
Inhalation	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a physician immediately.
Ingestion	IF SWALLOWED: Rinse Mouth. Do NOT induce vomiting. Call a physician immediately.
Self-protection of the first aider	First aider: Pay attention to self-protection!. Use personal protective equipment as required. Avoid contact with skin, eyes or clothing. Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

Most important symptoms and effects, both acute and delayed

Symptoms See Section 11: TOXICOLOGICAL INFORMATION.

Indication of any immediate medical attention and special treatment needed

Note to physicians Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media Caution: Use of water spray when fighting fire may be inefficient.

Flammable properties

Substance does not burn.

Specific hazards arising from the chemical

The product causes burns of eyes, skin and mucous membranes. Thermal decomposition can lead to release of irritating and toxic gases and vapors. In the event of fire and/or explosion do not breathe fumes.

Hazardous combustion products This material will not burn.

Protective equipment and precautions for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

U.S. Notice

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance. Outside of the US, only persons properly qualified according to state or local regulations should respond to a spill involving chemicals.

Personal precautions, protective equipment and emergency procedures

Personal precautions Evacuate personnel to safe areas. Remove all sources of ignition. Do not touch or walk through spilled material. Ventilate affected area. Use personal protective equipment as required.

For emergency responders Use personal protection recommended in Section 8.

Environmental precautions

Environmental precautions Do not allow into any sewer, on the ground or into any body of water. Should not be released into the environment. Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. See Section 12 for additional ecological information.

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so. Dike far ahead of liquid spill for later disposal.

Methods for cleaning up Take necessary precautions in observance of pertinent physical hazards. Neutralize spill if necessary. Soak up with inert absorbent material. Take up mechanically, placing in appropriate containers for disposal. Clean contaminated surface thoroughly. Dispose of in accordance with local, state and federal regulations or laws.

Emergency Response Guide Number Not applicable

7. HANDLING AND STORAGE

Precautions for safe handling

Advice on safe handling Use personal protective equipment as required. Avoid contact with skin, eyes or clothing. Do not breathe dust/fume/gas/mist/vapors/spray.

Conditions for safe storage, including any incompatibilities

Storage Conditions Keep container tightly closed in a dry and well-ventilated place. Keep out of the reach of children. Keep containers tightly closed in a dry, cool and well-ventilated place. Keep in properly labeled containers.

Flammability class Not applicable

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines

Chemical name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Sodium hydroxide 3 - 7%	Ceiling: 2 mg/m ³	TWA: 2 mg/m ³ (vacated) Ceiling: 2 mg/m ³	IDLH: 10 mg/m ³ Ceiling: 2 mg/m ³

Chemical name	Alberta OEL	British Columbia	Manitoba OEL	New Brunswick	Newfoundland &
---------------	-------------	------------------	--------------	---------------	----------------

		OEL		OEL	Labrador OEL
Sodium hydroxide 3 - 7%	Ceiling: 2 mg/m ³	Ceiling: 2 mg/m ³	Ceiling: 2 mg/m ³	Ceiling: 2 mg/m ³	Ceiling: 2 mg/m ³

Chemical name	Northwest Territories OEL	Nova Scotia OEL	Nunavut OEL	Ontario TWA	Prince Edward Island OEL
Sodium hydroxide 3 - 7%	Ceiling: 2 mg/m ³	Ceiling: 2 mg/m ³	Ceiling: 2 mg/m ³	Ceiling: 2 mg/m ³	Ceiling: 2 mg/m ³

Chemical name	Quebec OEL	Saskatchewan OEL	Yukon OEL
Sodium hydroxide 3 - 7%	Ceiling: 2 mg/m ³	Ceiling: 2 mg/m ³	Ceiling: 2 mg/m ³

Other Information Vacated limits revoked by the Court of Appeals decision in AFL-CIO v. OSHA, 965 F.2d 962 (11th Cir., 1992).

Legend See section 16 for terms and abbreviations

Appropriate engineering controls

Engineering Controls If no local exhaust use approved fume hood or self-contained breathing apparatus
If no local exhaust use approved fume hood and/or respirator
Showers
Eyewash stations

Individual protection measures, such as personal protective equipment

Eye/face protection Wear tight sealing safety goggles and/or face protection shield. Avoid contact with eyes.

Skin and body protection Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Respiratory protection Do not breathe gas/fumes/vapor/spray. If no local exhaust use approved fume hood and/or respirator. In case of inadequate ventilation wear respiratory protection.

General Hygiene Considerations Avoid breathing (dust, vapor, mist, gas). Avoid contact with skin, eyes or clothing. Use personal protective equipment as required. Wear suitable gloves and eye/face protection. Wash face, hands and any exposed skin thoroughly after handling. Do not eat, drink or smoke when using this product. Keep away from food, drink and animal feeding stuffs. Regular cleaning of equipment, work area and clothing is recommended. Handle in accordance with good industrial hygiene and safety practice. Avoid prolonged or repeated contact with skin. Take off all contaminated clothing and wash it before reuse.

Environmental exposure controls

Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state Liquid

Gas Under Pressure Not classified according to GHS criteria

Appearance aqueous solution

Color Colorless to light yellow

Odor None

Odor threshold Not applicable

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<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
Molecular weight	Not applicable	
pH	10.0	
Melting point/freezing point	No data available	
Boiling point / boiling range	~ 100 °C / 212 °F	Estimation based on theoretical calculation
Evaporation rate	0.46 (water = 1)	
Vapor pressure	No data available	
Vapor density (air = 1)	No data available	
Specific gravity (water = 1 / air = 1)	1.163	
Partition Coefficient (n-octanol/water)	No information available	
Soil Organic Carbon-Water Partition Coefficient	No data available	
Autoignition temperature	No data available	
Decomposition temperature	No information available	
Dynamic viscosity	No data available	
Kinematic viscosity	No information available	

Solubility(ies)

Water solubility

<u>Water solubility classification</u>	<u>Water solubility</u>	<u>Water Solubility Temperature</u>
Soluble	> 1000 mg/L	25 °C / 77 °F

Solubility in other solvents

<u>Chemical Name</u>	<u>Solubility classification</u>	<u>Solubility</u>	<u>Solubility Temperature</u>
Acid	Soluble	> 1000 mg/L	25 °C / 77 °F

Other Information

Metal Corrosivity	Not classified as corrosive to metal according to GHS criteria
GHS Metal Corrosivity Classification	Category 1, H290
Steel Corrosion Rate	No data available /
Aluminum Corrosion Rate	No data available /
Bulk density	Not applicable
Explosive properties	Not classified according to GHS criteria.
Explosion data	No data available
Upper explosion limit	No information available

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Lower explosion limit

No information available

Flammable properties

Not classified as flammable according to GHS criteria.

Flammability Limit in Air

Upper flammability limit:

No data available

Lower flammability limit:

No data available

Flash point

No data available

Method

No information available

Oxidizing properties

Not classified according to GHS criteria.

Reactivity properties

Not classified as self-reactive, pyrophoric, self-heating or emitting flammable gases in contact with water according to GHS criteria.

10. STABILITY AND REACTIVITY

Reactivity properties

Not classified as self-reactive, pyrophoric, self-heating or emitting flammable gases in contact with water according to GHS criteria

Chemical stability

Stable under recommended storage conditions.

Special dangers of the product

None reported

Possibility of Hazardous Reactions

None under normal processing.

Hazardous polymerization

Hazardous polymerization does not occur.

Conditions to avoid

Extremes of temperature and direct sunlight. Incompatible materials.

Incompatible materials

Strong oxidizing agents. Strong acids. Strong bases.

Hazardous Decomposition Products

Thermal decomposition can lead to release of irritating and toxic gases and vapors.

Explosive properties

Not classified according to GHS criteria.

Upper explosion limit

No information available

Lower explosion limit

No information available

Autoignition temperature

No data available

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Sensitivity to Static Discharge

None reported

Sensitivity to Mechanical Impact

None reported

11. TOXICOLOGICAL INFORMATION

Information on Likely Routes of Exposure

Product Information	Corrosive to skin. Corrosive to eyes.
Inhalation	Causes burns. Corrosive by inhalation.
Eye contact	Corrosive to the eyes and may cause severe damage including blindness. Causes burns.
Skin contact	Cause severe skin burns and eye damage.
Ingestion	Ingestion causes burns of the upper digestive and respiratory tracts.
Aggravated Medical Conditions	Eye disorders. Skin disorders. Respiratory disorders.
Toxicologically synergistic products	None known.
Toxicokinetics, metabolism and distribution	No information available.

Product Acute Toxicity Data

Oral Exposure Route	No data available
Dermal Exposure Route	No data available
Inhalation (Dust/Mist) Exposure Route	No data available
Inhalation (Vapor) Exposure Route	No data available
Inhalation (Gas) Exposure Route	No data available

Unknown Acute Toxicity

0% of the mixture consists of ingredient(s) of unknown toxicity.

Acute Toxicity Estimations (ATE)

The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral)	33,798.00 mg/kg
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Ingredient Acute Toxicity Data

Oral Exposure Route					
If available, see data below					
Chemical name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Sodium hydroxide (3 - 7%) CAS#: 1310-73-2	Rabbit LD ₅₀	500 mg/kg	None reported	None reported	No information available

Dermal Exposure Route					
If available, see data below					
Chemical name	Endpoint type	Reported dose	Exposure time	Toxicological effects	Key literature references and sources for data
Sodium hydroxide (3 - 7%) CAS#: 1310-73-2	Rabbit LD ₅₀	1350 mg/kg	None reported	None reported	IUCLID (The International Uniform Chemical Information Database)

Inhalation (Dust/Mist) Exposure Route	If available, see data below
Inhalation (Vapor) Exposure Route	If available, see data below
Inhalation (Gas) Exposure Route	If available, see data below

Product Specific Target Organ Toxicity Single Exposure Data

Oral Exposure Route	No data available
Dermal Exposure Route	No data available
Inhalation (Dust/Mist) Exposure Route	No data available
Inhalation (Vapor) Exposure Route	No data available
Inhalation (Gas) Exposure Route	No data available

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Ingredient Specific Target Organ Toxicity Single Exposure Data

Oral Exposure Route	If available, see data below
Dermal Exposure Route	If available, see data below
Inhalation (Dust/Mist) Exposure Route	If available, see data below
Inhalation (Vapor) Exposure Route	If available, see data below
Inhalation (Gas) Exposure Route	If available, see data below

Aspiration toxicity

If available, see data below

Kinematic viscosity

No information available

Product Skin Corrosion/Irritation Data

No data available.

Ingredient Skin Corrosion/Irritation Data

If available, see data below

Chemical name	Test method	Species	Reported dose	Exposure time	Results	Key literature references and sources for data
Sodium hydroxide (3 - 7%) CAS#: 1310-73-2	Patch test	Human	20 mg	24 hours	Corrosive to skin	RTECS (Registry of Toxic Effects of Chemical Substances)

Product Serious Eye Damage/Eye Irritation Data

No data available.

Ingredient Eye Damage/Eye Irritation Data

If available, see data below

Chemical name	Test method	Species	Reported dose	Exposure time	Results	Key literature references and sources for data
Sodium hydroxide (3 - 7%) CAS#: 1310-73-2	Standard Draize Test	Rabbit	0.05 mg	24 hours	Corrosive to eyes	RTECS (Registry of Toxic Effects of Chemical Substances)

Sensitization Information

Product Sensitization Data

Skin Sensitization Exposure Route

No data available.

Respiratory Sensitization Exposure Route

No data available.

Ingredient Sensitization Data

Skin Sensitization Exposure Route

If available, see data below.

Respiratory Sensitization Exposure Route

If available, see data below.

Chronic Toxicity Information

Product Specific Target Organ Toxicity Repeat Dose Data

Oral Exposure Route	No data available.
Dermal Exposure Route	No data available.
Inhalation (Dust/Mist) Exposure Route	No data available.
Inhalation (Vapor) Exposure Route	No data available.
Inhalation (Gas) Exposure Route	No data available.

Ingredient Specific Target Organ Toxicity Repeat Exposure Data

Oral Exposure Route	If available, see data below
Dermal Exposure Route	If available, see data below
Inhalation (Dust/Mist) Exposure Route	If available, see data below
Inhalation (Vapor) Exposure Route	If available, see data below
Inhalation (Gas) Exposure Route	If available, see data below

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Product Carcinogenicity Data

Oral Exposure Route	No data available
Dermal Exposure Route	No data available
Inhalation (Dust/Mist) Exposure Route	No data available
Inhalation (Vapor) Exposure Route	No data available
Inhalation (Gas) Exposure Route	No data available

Ingredient Carcinogenicity Data

Chemical name	CAS No.	ACGIH	IARC	NTP	OSHA
Sodium hydroxide	1310-73-2	-	-	-	-

Legend

ACGIH (American Conference of Governmental Industrial Hygienists)	Does not apply
IARC (International Agency for Research on Cancer)	Does not apply
NTP (National Toxicology Program)	Does not apply
OSHA (Occupational Safety and Health Administration of the US Department of Labor)	Does not apply

Oral Exposure Route	If available, see data below
Dermal Exposure Route	If available, see data below
Inhalation (Dust/Mist) Exposure Route	If available, see data below
Inhalation (Vapor) Exposure Route	If available, see data below
Inhalation (Gas) Exposure Route	If available, see data below

Product Germ Cell Mutagenicity *invitro* Data

No data available.

Ingredient Germ Cell Mutagenicity *invitro* Data

No data available

Product Germ Cell Mutagenicity *invivo* Data

Oral Exposure Route	No data available
Dermal Exposure Route	No data available
Inhalation (Dust/Mist) Exposure Route	No data available
Inhalation (Vapor) Exposure Route	No data available
Inhalation (Gas) Exposure Route	No data available

Ingredient Germ Cell Mutagenicity *invivo* Data

Oral Exposure Route	If available, see data below
Dermal Exposure Route	If available, see data below
Inhalation (Dust/Mist) Exposure Route	If available, see data below
Inhalation (Vapor) Exposure Route	If available, see data below
Inhalation (Gas) Exposure Route	If available, see data below

Product Reproductive Toxicity Data

Oral Exposure Route	No data available
Dermal Exposure Route	No data available
Inhalation (Dust/Mist) Exposure Route	No data available
Inhalation (Vapor) Exposure Route	No data available
Inhalation (Gas) Exposure Route	No data available

Ingredient Reproductive Toxicity Data

Oral Exposure Route	If available, see data below
Inhalation (Dust/Mist) Exposure Route	If available, see data below
Inhalation (Vapor) Exposure Route	If available, see data below
Inhalation (Gas) Exposure Route	If available, see data below

12. ECOLOGICAL INFORMATION

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Ecotoxicity

Product Ecological Data

Aquatic toxicity

Fish	No data available
Crustacea	No data available
Algae	No data available

Ingredient Ecological Data

Aquatic toxicity

Fish

If available, see ingredient data below

Chemical name	Exposure time	Species	Endpoint type	Reported dose	Key literature references and sources for data
Sodium hydroxide (3 - 7%) CAS#: 1310-73-2	96 hours	<i>Oncorhynchus mykiss</i>	LC ₅₀	45.4 mg/L	IUCLID (The International Uniform Chemical Information Database)

Crustacea

If available, see ingredient data below

Chemical name	Exposure time	Species	Endpoint type	Reported dose	Key literature references and sources for data
Sodium hydroxide (3 - 7%) CAS#: 1310-73-2	48 Hours	<i>Daphnia sp.</i>	EC ₅₀	40.4 mg/L	IUCLID (The International Uniform Chemical Information Database)

Algae

If available, see ingredient data below

Other Information

Persistence and degradability

Product Biodegradability Data

If available, see ingredient data below.

Ingredient Biodegradability Data

Test data reported below

Chemical name	Test method	Biodegradation	Exposure time	Results
Butanedioic acid, 2,3-dihydroxy-[R-(R*, R*)]-, disodium salt (7 - 13%) CAS#: 868-18-8	None reported	73%	14 days	Readily biodegradable
Sodium hydroxide (3 - 7%) CAS#: 1310-73-2	None reported	None reported	None reported	Readily biodegradable

Bioaccumulation

Product Bioaccumulation Data

No data available.

Partition Coefficient (n-octanol/water)

No information available

Ingredient Bioaccumulation Data

No data available

Chemical name	Partition Coefficient (n-octanol/water)	Method
Sodium hydroxide (3 - 7%)	log K _{ow} ~ 0	No information available

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CAS#: 1310-73-2		
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Mobility

Product Information

Soil Organic Carbon-Water Partition Coefficient No data available

Water solubility

<u>Water solubility classification</u>	<u>Water solubility</u>	<u>Water Solubility Temperature</u>
Soluble	> 1000 mg/L	25 °C / 77 °F

Ingredient Information

<u>Chemical name</u>	<u>Soil Organic Carbon-Water Partition Coefficient</u>	<u>Method</u>
Sodium hydroxide (3 - 7%) CAS#: 1310-73-2	log K _{oc} ~ 0	No information available

<u>Chemical name</u>	<u>Water solubility classification</u>	<u>Water solubility</u>	<u>Water solubility temperature °C</u>	<u>Water solubility temperature °F</u>
Sodium hydroxide CAS#: 1310-73-2	Completely soluble	420000 mg/L	0 °C	32 °F

Other adverse effects

No information available.

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Disposal of wastes Disposal should be in accordance with applicable regional, national, and local laws and regulations.

Contaminated packaging Do not reuse container.

Special instructions for disposal Dilute to 3 to 5 times the volume with cold water. Adjust to a pH between 6 and 9 with an acid, such as sulfuric or citric. Open cold water tap completely, slowly pour the reacted material to the drain. Allow cold water to run for 5 minutes to completely flush the system.

14. TRANSPORT INFORMATION

U.S. DOT Not regulated

TDG Not regulated

IATA Not regulated

IMDG Not regulated

Additional information

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There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is not in a reagent set or kit, the classification given above applies.
If the item is part of a reagent set or kit the classification would change to the following:
UN3316 Chemical Kit, Hazard Class 9, Packing Group II or III.
If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

National Inventories

TSCA Complies
DSL/NDSL Complies

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

International Inventories

EINECS/ELINCS Complies
ENCS Complies
IECSC Complies
KECL Complies
PICCS Complies
TCSI Complies
AICS Complies
NZIoC Complies

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
TCSI - Taiwan Chemical Substances Inventory
AICS - Australian Inventory of Chemical Substances
NZIoC - New Zealand Inventory of Chemicals

US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

SARA 311/312 Hazard Categories

Acute health hazard	Yes
Chronic Health Hazard	Yes
Fire hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

CWA (Clean Water Act)

This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Sodium hydroxide 1310-73-2	1000 lb	-	-	X

CERCLA

This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and

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Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material

Chemical name	Hazardous Substances RQs	CERCLA/SARA RQ	Reportable Quantity (RQ)
Sodium hydroxide 1310-73-2	1000 lb	-	RQ 1000 lb final RQ RQ 454 kg final RQ

US State Regulations

California Proposition 65

This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

Chemical name	New Jersey	Massachusetts	Pennsylvania
Sodium hydroxide 1310-73-2	X	X	X

U.S. EPA Label Information

Chemical name	FIFRA	FDA
Sodium hydroxide	180.0910	21 CFR 184.1763

16. OTHER INFORMATION, INCLUDING DATE OF PREPARATION OF THE LAST REVISION

Special Comments

None

Additional information

Global Automotive Declarable Substance List (GADSL)

Not applicable

NFPA and HMIS Classifications

NFPA	Health hazards - 3	Flammability - 0	Instability - 0	Physical and Chemical Properties -
HMIS	Health hazards - 3	Flammability - 0	Physical Hazards - 0	Personal protection - X - See section 8 for more information

Key or legend to abbreviations and acronyms used in the safety data sheet

NIOSH IDLH Immediately Dangerous to Life or Health
ACGIH ACGIH (American Conference of Governmental Industrial Hygienists)
NDF no data

Legend - Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

TWA TWA (time-weighted average) STEL STEL (Short Term Exposure Limit)
MAC Maximum Allowable Concentration Ceiling Ceiling Limit Value

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X	Listed	Vacated	These values have no official status. The only binding levels of contaminants are those listed in the final OSHA PEL. These lists are for reference purposes only. Please note that some reference state regulations of these "liberated" exposure limits in their state regulations.
SKN*	Skin designation	SKN+	Skin sensitization
RSP+	Respiratory sensitization	**	Hazard Designation
C	Carcinogen	R	Reproductive toxicant
M	mutagen		

Prepared By Hach Product Compliance Department

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Revision Note None

Disclaimer

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

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End of Safety Data Sheet

APPENDIX E – Employee Training Record

Illicit Discharge Detection and Elimination (IDDE)

Employee Training Record

Town of Needham, Massachusetts

Date of Training: _____

Duration of Training: _____

Name	Title	Signature